

Technical Report 1127

**Measures Collected on the USMA Class of 1998 as
Part of the Baseline Officer Longitudinal Data Set
(BOLDS)**

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for the Behavioral and Social Sciences**

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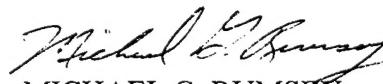
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FOREWORD

The U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) conducts research on personnel performance and training in support of Army goals. A primary concern of the U.S. Army is to develop effective future leaders. To advance research on leader development and enhance our understanding of the leader development process, ARI and the United States Military Academy (USMA) initiated a cooperative effort to examine the development of leaders from a longitudinal perspective.

The initial phase of this effort collected information on a variety of personal attributes and performance measures from USMA cadets in the class of 1998, creating the Baseline Officer Longitudinal Data Set (BOLDS). This report describes the cognitive, motivational, physical, and other personal characteristic measures that were collected and provides preliminary psychometric data. Information contained in this report has been briefed to Lieutenant General Daniel W. Christman, Superintendent, USMA (now retired); Brigadier General Daniel J. Kaufman, Dean of the Academic Board, USMA; and Brigadier General Dorian T. Anderson, Director, Officer Personnel Management Directorate, U.S. Total Army Personnel Command.

Future phases of BOLDS will track these officers through their Army careers, while analyzing predictors of success. These data will provide insights into the characteristics and experiences that contribute to leader development and enable the Army to develop strategies and policy guidelines to improve leader development for the Objective Force.



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The authors wish to extend a special note of appreciation to Dr. Trueman Tremble, Selection and Assignment Research Unit, ARI, for his invaluable insights into the history and development of BOLDS. Without his input, several mysteries regarding the database would remain.

We also would like to take this opportunity to thank the cadets in USMA's class of 1998 who participated in BOLDS data collections. Without their support, we would not have this extraordinary database from which to examine leader development longitudinally.

MEASURES COLLECTED ON THE USMA CLASS OF 1998 AS PART OF THE BASELINE OFFICER LONGITUDINAL DATA SET (BOLDS)

EXECUTIVE SUMMARY

Research Requirement:

Though extensive research exists in the area of leadership, few studies have explored the development of individual leaders over time. To examine this developmental process, the U.S. Military Academy (USMA) and the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) collaborated to develop the Baseline Officer Longitudinal Data Set (BOLDS). As a longitudinal database, BOLDS would enable researchers to:

- identify the cognitive, personality, and/or social factors that contribute to the development of good Army leaders,
- describe changes over time in the leadership performance of individuals, and
- identify experiences that contribute to leader development.

A first step in analyzing the BOLDS data is to identify the personal characteristic measures that were collected and describe their psychometric properties.

Procedure:

Beginning with the class of cadets admitted to USMA in 1994, data were collected on these individuals over the four years of their pre-commissioning education. These included data obtained from student records and from measures administered specifically for BOLDS research purposes. These data covered 10 broad categories pertaining to leader development: cognitive aptitude, complex problem-solving skills, tacit knowledge, temperament, motivation, leadership style, leadership performance, physical fitness, cognitive-emotional identity development, and developmental experiences (e.g., extracurricular activities, sports participation, military training, duty positions held). Within these categories, more than 30 constructs were measured.

Findings:

As with most complex data sets, the data associated with BOLDS exist in various states and statuses. For instance, all of the variables do not exist for each cadet because the sampling scheme used to administer measures sought to reduce cadet participation time and the effects of repeated measurements. Moreover, some of the variables collected reside at USMA but are not

currently in ARI's database. Other measures exist only as scale scores rather than as item values, and some measures still need to be scored.

Among the data available to ARI, variables showed reasonable ranges and means, though several distributions were skewed. The reliabilities that could be computed, as well as those cited from the literature, tended to be acceptable, though the complex problem-solving instruments raise concern. The 360-degree ratings of leadership style and performance may allow for interesting comparisons in the future. Lastly, factor analysis of the measures resulted in three factors (cognitive aptitude, good leadership, and achievement), highlighting cognitive readiness, adaptability, and achievement orientation as facets of leadership measured by the BOLDS battery.

Utilization of Findings:

Acting as both an introduction to the BOLDS research project and a reference for its measures, the compilation of variables described in this document provides a central resource for users of the BOLDS database. Moreover, as this extensive database continues to grow and as researchers continue to analyze its contents, clear documentation of its measures will be essential, as a historical record and a foundation for future research. The longitudinal nature of BOLDS offers researchers the unique opportunity to provide insight into the emergence and development of leadership among Army officers.

MEASURES COLLECTED ON THE USMA CLASS OF 1998 AS PART OF THE BASELINE
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INTRODUCTION

In support of the U.S. Army's commitment to leader development, in 1993 the U.S. Military Academy (USMA)¹ and the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) embarked on a joint research program intended to fill a gap in the field of leadership studies. Though much research concerning leadership had been conducted, few studies examined the changes in individual leader performance and effectiveness over time. A basic premise of the USMA-ARI program was that such longitudinal research was necessary to establish definitive information about leadership emergence and development. The specific objective of the research program was to build a longitudinal database that would enable researchers to:

- identify the cognitive, personality, and/or social factors that contribute to the development of good Army leaders,
- describe changes over time in the leadership performance of individuals, and
- identify experiences that contribute to leader development.

The program focused on developing the Baseline Officer Longitudinal Data Set (BOLDS). Beginning with the class of cadets entering USMA in 1994, data were collected on these individuals over the four years of their pre-commissioning education. Project developers envisioned that subsequent phases of the program would follow these leaders through later career periods and that the database would be expanded to include officers from commissioning sources other than USMA. At the present time, however, BOLDS includes data only from cadets in the class of 1998 while they were in attendance at West Point.

Report Objectives

The purpose of the current report is to describe the measures contained in BOLDS. Specifically, we will accomplish the following objectives:

- (1) provide a comprehensive list of the constructs and measurement tools used in the first phase of BOLDS (i.e., while cadets in the class of 1998 were attending USMA),
- (2) present descriptive statistics on these measures, and
- (3) examine relationships among the measures.

¹ The acronyms used throughout this report are spelled out upon first usage. A complete list of acronyms and their explanations can be found in Appendix A.

The Foundation of BOLDS

The research model underlying BOLDS views the ongoing interactions of individuals with and within their environments as a critical aspect of leader development (Tremble, 1997). According to the model, development is indicated by change in cognitive functioning, affective tendencies, and/or behavioral qualities. Hence, for the BOLDS project, researchers sought measures of constructs related to personal attributes and abilities, leadership qualities, environmental experiences, and leadership effectiveness. Many of the constructs identified as possible measures originated from previously conducted ARI research.

Three research programs, in particular, contributed to the foundation upon which BOLDS was built. The first program resulted from a series of contracts ARI made with Management Research Institute, Inc. (MRI) through the Small Business Innovation Research (SBIR) program. The projects revolved around developing and testing a model of leadership skills, based on the idea that effective leadership behavior depends on a leader's ability to solve the complex (i.e., novel and ill-defined) social problems that arise in his/her organization (Mumford, Zaccaro, Harding, Fleishman, and Reiter-Palmon, 1993). From this skills-based model emerged several cognitive and problem-solving measures that were administered in the BOLDS project.

The second research program was a four-year study at the Virginia Military Institute (VMI) with the class of 1995 to assess leadership development over time and determine the individual characteristics and behaviors that impact subsequent leader emergence and effectiveness (Atwater, Dionne, Avolio, Camobreco, and Lau, 1996, 1999). The results of this research substantiated for the BOLDS project the importance of cognitive aptitude, physical fitness, prior "influence experiences," and self-esteem to predicting leader emergence among cadets. Likewise, physical fitness, prior "influence experiences," and leadership style (e.g., transformational, laissez-faire) were pertinent to predicting cadet leader effectiveness.

The third major program with implications for BOLDS was research by Horvath et al. (1996) that developed and validated measures of tacit knowledge (i.e., the unspoken, action-oriented type of knowledge acquired through personal experience) relating to military leadership. One of the resulting products of this research was the Tacit Knowledge for Military Leaders – Platoon Leader Questionnaire, which is a scenario-based measure that captures junior leaders' knowledge of how to handle interpersonal leadership issues. This instrument was administered to USMA cadets for inclusion in BOLDS.

Acquiring Data for BOLDS

Data for BOLDS were acquired in part from information routinely collected by USMA and in part from surveys administered specifically for BOLDS. As a longitudinal project, BOLDS evolved as it progressed, shaped by three distinct research tasks: the assembly of archival data, the collection of new data, and the verification of constructs. Lessons learned from each of these research tasks at early stages were used to inform later stages of BOLDS data collection, scoring, and analysis.

Assembly of Archival Data

In part to reduce the burden and possible artifacts of repeated subject participation, researchers sought to identify and extract as much data as possible from USMA's archival records. Three USMA offices, in particular, were repositories for data useful to BOLDS research. The Directorate of Admissions maintained files describing cadets prior to admission. These data included high school background information such as sports participation, extracurricular activities, and faculty appraisals.

In addition, the Institutional Research and Analysis Branch (IRAB), Office of Policy, Planning, and Analysis, maintained data on cadets throughout their education and military development at USMA. IRAB files included such data as Nelson-Denny Reading Test scores and two surveys USMA administers annually to incoming cadets (the Student Information Form [SIF] and the Class Characteristics Inventory [CCI]). Using items from the SIF and the CCI, Evans (1997) developed analog measures of the scales in the NEO Personality Inventory (NEO-PI) and the Assessment of Background and Life Experiences (ABLE). These analog measures substituted for administering a temperament measure directly to cadets in the class of '98. (For more information regarding the ABLE and NEO-PI analog scales, refer to Milan, in press.)

Lastly, the Leader Development Branch (LDB), U.S. Corps of Cadets, administered USMA's Leadership Evaluation and Developmental Ratings (LEADR) system, which provided military development (leadership) grades and cadet performance ratings each semester. The construct validity of the Cadet Performance Report (CPR) ratings was examined by Schwager and Evans (1996), who supported their use as measures of leadership behavior in BOLDS.

Collection of New Data

In addition to the data already collected by USMA, some measures were administered specifically for the BOLDS project because they had been identified in previous research and theory as being pertinent to leader development. Some of these measures were administered only once, while others were administered multiple times over the four years. Moreover, each administration involved only a subset of cadets (e.g., particular companies), rather than the entire class of '98 (see further description in the Method section).

Verification of Constructs

Certain studies were conducted in parallel with BOLDS, using other subject pools to verify the construct validity of measures administered for BOLDS or to identify improvements for the measures (Tremble, 1997). For instance, underlying BOLDS is a theoretical model that defines leadership as organizational problem solving. At the inception of BOLDS, this model and its associated measures had been tested only once, on officers sampled from Officer Basic Courses through Army War College. Hence, a study was conducted to examine whether the original findings could be replicated among chain-of-command officers in 53 Army battalions, thereby supporting decisions to continue using the model and its measures for BOLDS (Tremble, Kane, and Stewart, 1997).

A second example involved a few of the cognitive and problem-solving instruments used in BOLDS. These instruments presented participants with a scenario or stem to which they were asked to generate open-ended responses. To address reliability and construct validity concerns, a study was conducted to examine and improve the scoring systems for three of these instruments (Dela Rosa, Knapp, Katz, & Payne, 1997).

Lastly, various analyses included the Multifactor Leadership Questionnaire (MLQ), a measure of leadership style (e.g., transformational, transactional, laissez-faire) used to rate the leadership behavior of oneself or other officers in one's chain of command (Bass and Avolio, 1991). For instance, Bullis, Kane, and Tremble (1997) examined the factor structure of the MLQ, finding that the relationship between transformational leadership and contingent reward changed across organizational level and suggesting that the five transformational scales (due to their strong intercorrelations) did not represent separate components of transformational leadership. Moreover, Kane and Tremble (2000) explored the effects of transformational leadership on subordinates' outcomes at different organizational levels, finding that transformational leader behaviors augmented the effects of transactional behaviors on followers' job motivation and affective commitment and that these effects increased as a function of the focal leaders' rank.

METHOD

Setting: USMA

When being considered for admission to USMA, prospective students are evaluated on a variety of criteria, including academic performance, athletic aptitude, and leadership potential. During the admissions process, USMA officers collect information about the students from their high school officials, high school records (e.g., grades, SAT/ACT scores, extracurricular activities), employers, and the students themselves.

If admitted to USMA, students arrive at West Point during the summer prior to their freshman (Plebe) year of study. For six weeks during this summer, students experience Cadet Basic Training (CBT, a.k.a. Beast Barracks), designed to train new cadets in basic soldier skills and to instill in them the ideals of West Point and the Army. Students who successfully complete CBT begin their Plebe year in September.

Participants: USMA Cadets

The USMA class of 1998 was initially composed of 1143 individuals who arrived at West Point to participate in the summer 1994 CBT activities. At the end of the summer, 1052 individuals remained. For purposes of this report, the number of cadets who completed each of the subsequent academic terms was determined to be all those who had in the BOLDS database a final Military Development grade for the term.² Accordingly, 1006 cadets (88% of those who

² A few Military Development grades each term could be missing from BOLDS, thus under-representing the true number of cadets remaining in the class.

started CBT) completed their first academic term at USMA. The cadets who left USMA prior to completing one academic term are not included in any analyses reported in this document (aside from citing their final grades and performance reports from the first summer). Table 1 displays the number of cadets completing each term and the number of cadets leaving USMA – based on BOLDS data. Of the 1143 students who were admitted in 1994, 883 (77%) graduated in 1998.

Table 1.
Number of Cadets in the Class of 1998 Each Term, Based on BOLDS Data

School Year	Term	Number of Cadets Who Completed Term	Number of Cadets Who Left USMA
CBT (1143 cadets began)	Summer 1994	1052	91
1 st Year (Plebe)	1 – Fall '94	1006	46
	2 – Spr '95	980	26
2 nd Year (Yearling)	3 – Fall '95	946	34
	4 – Spr '96	918	28
3 rd Year ¹ (Cow)	5 – Fall '96	884	34
	6 – Spr '97	879	5
4 th Year (Firstie)	7 – Fall '97	859	20
	8 – Spr '98	883 ²	–

¹ Once cadets begin their third year, they are obligated to serve five years of active duty and three years in a Reserve Component after graduating from USMA and receiving their commission.

² This is the total number of cadets who actually graduated in the class of 1998, based on official USMA records, not BOLDS data.

Among USMA's archival records exist a variety of demographic information and biodata on cadets, particularly from two surveys – the SIF and the CCI. From these sources researchers can construct descriptions of the participants in BOLDS. The few characteristics that follow were selected to provide a glimpse of these cadets. Of the initial 1006 Plebes who completed at least one academic term at USMA, 87% were male and 13% were female. Among both male and female cadets, the vast majority was Caucasian (83% and 80%, respectively). In contrast, 13% of female cadets were black as compared to 5% of male cadets. The ethnic breakdown of the Plebes can be seen in Table 2. Overall, the composition of this class changed minimally between their first term at USMA and the first term of their Firstie (Senior) year, as noted in Table 3.

Table 2.
Percentage of Ethnic Categories Among Cadets and Among Commissioned Officers

Ethnicity¹	% Male BOLDS Cadets (FY94) (N = 879)	% Female BOLDS Cadets (FY94) (N = 127)	% Male Commissioned Officers (FY98)²	% Female Commissioned Officers (FY98)²
White	83	80	82	69
Black	5	13	10	20
Hispanic	5	4	4	4
Asian	6	2	— ³	— ³
Other	1	2	5	7

¹ Source: USMA records.

² Source: "Army Demographics FY98" produced by Dr. Betty D. Maxfield and SPC Gerry L. Green, Demographics Unit, Human Resources Directorate, Office of the Deputy Chief of Staff for Personnel, Department of the Army Headquarters, Washington, DC 20310-0300.

³ The category "Asian" was not distinguished among these data; it is incorporated in the "Other" category.

Table 3.
Comparison of the Class of 1998 Between Its First and Seventh Terms

Personal Characteristic	% 1st Term Fall '94	% 7th Term Fall '97
Gender¹	(N = 1006)	(N = 859)
Male	87	89
Female	13	12
Ethnicity¹	(N = 1006)	(N = 859)
White	83	83
Black	6	5
Asian	6	6
Hispanic	5	5
American Indian	1	1
Other	1	1
Political Views²	(N = 925)	(N = 791)
Far right	5	5
Conservative	49	50
Middle of the road	35	34
Liberal	11	11
Far left	1	1

¹ Source: USMA records.

² Source: Astin 1994 Student Information Form.

With respect to political views, over half of male cadets considered their political views to be "conservative" or "far right" (56%) as opposed to one-third of female cadets (35%). Conversely, 22% of females considered themselves to be "liberal" or "far left," compared to 10% of males (see Table 4). Differences in political views existed among ethnic groups as well, with whites more likely to be "conservative" and blacks more likely to be "liberal."

Table 4.
Political Views Expressed by Entering Cadets (N = 925)

	Far Left	Liberal	Middle of the Road	Conservative	Far Right
Gender¹					
% Male	1	9	34	51	5
% Female	1	21	44	33	2
% Total	1	11	35	49	5
Ethnicity²					
% White	<1	8	34	53	5
% Black	2	48	41	10	0
% Hispanic	2	11	53	31	2
% Asian	0	14	37	45	4
% Other	0	8	62	31	0

¹ When political views categories are collapsed into "liberal," "middle of the road," and "conservative," there is a statistically significant difference between male and female cadets, $\chi^2(2, N = 925) = 24.812, p < .001$.

² When political views are collapsed and the "other" ethnic category is excluded, white, black, Hispanic, and Asian cadets differ in their political views, $\chi^2(6, N = 912) = 88.721, p < .001$.

As Table 5 shows, four-fifths of the Plebes entering in 1994 graduated from public high schools (83%), and three-quarters graduated in 1994 (75%). According to self-reports, over half of Plebes ranked academically in the top 10% of their high school class (61%), and nearly three-quarters finished high school with a grade point average of A- or higher (71%). Among the cadets remaining during their senior year, these percentages barely changed.

Table 5.
Cadets' High School Experiences

High School Experience	% 1 st Term Fall '94	% 7 th Term Fall '97
H.S. type attended senior year ¹	(N = 1002)	(N = 856)
Public	83	83
Private	17	17
H.S. graduation year ²	(N = 967)	(N = 822)
1994	75	74
1993	25	26
H.S. class rank ¹	(N = 979)	(N = 839)
Top 10%	61	61
Second 10%	23	23
Second 20%	12	12
Middle 20%	4	4
Lowest 40%	<1	<1
H.S. GPA ¹	(N = 990)	(N = 847)
A+	19	19
A	30	30
A-	23	22
B+	16	16
B	9	8
B-	3	3
≤ C+	1	1

¹ Source: Class Characteristics Inventory – Class of 1998.

² Source: Astin 1994 Student Information Form.

Procedure: BOLDS Data Collection and Project Management

Data collection for the BOLDS project began in the summer of 1994 using two methods. First, data that are routinely accumulated and stored for administrative purposes were retrieved from USMA's archives. For instance, during cadets' initial summer at West Point, they routinely complete a series of instruments, allowing USMA to track the attitudes, abilities, behaviors, and background characteristics of its cadet population. Thereafter, cadets earn Military Development grades, course grades, and physical fitness test scores, all of which are maintained in USMA's records. Data such as these were culled from the archives for inclusion in BOLDS.

The second data collection method was unique to the class of 1998. Throughout their four years at USMA, these cadets actively participated in BOLDS by responding to a variety of primarily paper-and-pencil measures. For example, in addition to the instruments administered to every incoming class during their initial summer session, for the BOLDS project, cadets were asked to complete five additional instruments, measuring such abilities as logical reasoning, spatial visualization, and writing skills. A complete listing of the measures and when they were administered can be seen in Table 6.

To minimize the effects of repeated measurements and to reduce the amount of participation time required from each cadet, a sampling scheme was devised by which only subsets of cadets participated each year (see Figure 1). Hence, across their four years at West Point, cadets from the class of '98 cohort participated intermittently in data collection efforts associated with BOLDS, meaning that no cadet has data available for every variable in the database.

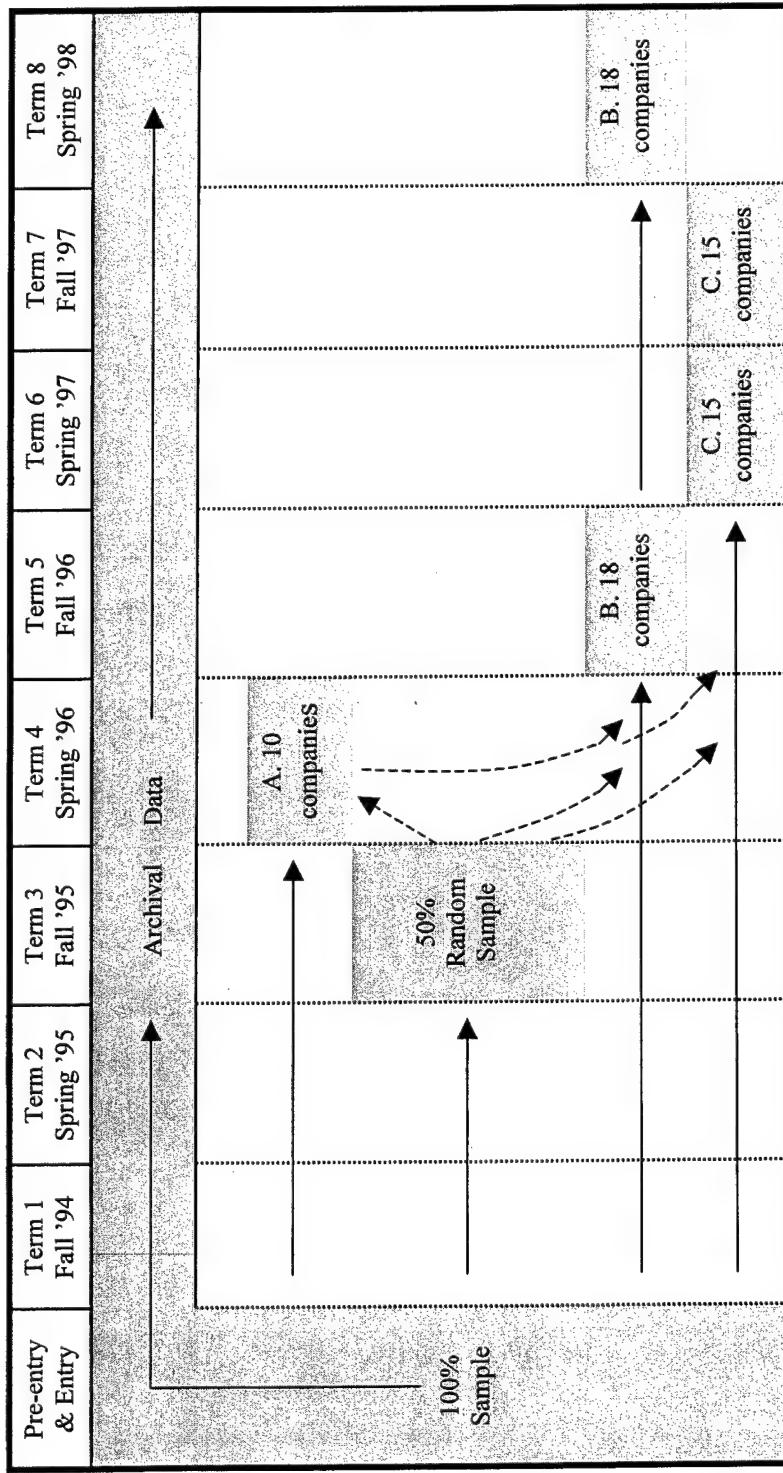
Until 1997, ARI and the Department of Behavioral Sciences and Leadership at USMA were jointly involved in managing the BOLDS project and scoring and compiling the data; the final year, however, was completed by the LDRC alone. Data from most of the measures have since been entered into computer files. As of the summer 2001, these computer files are available at the Leader Development Research Center (LDRC) at West Point. Files containing a subset of these data are available at ARI.

Table 6. BOLDS Database (Items in boldface type are not yet available in the ARI database)

High School	Summer '94	Term 1 Fall '94	Term 2 Spring '95	Term 3 Fall '95	Term 4 Spring '96	Term 5 Fall '96	Term 6 Spring '97	Term 7 Fall '97	Term 8 Spring '98
		<i>N=100% of Class of '98 [N=1006]</i>	<i>N=100% of Class of '98 [N=980]</i>	<i>N=100% [N=946]</i>	<i>N=100% [N=918]</i>	<i>N=100% [N=884]</i>	<i>N=100% [N=879]</i>	<i>N=100% [N=859]</i>	<i>N=100% [N=859]</i>
<u>Cog. Abilities</u> SAT or ACT CEER (high school rank & SAT/ACT)	Astin SIF CCI ABLE & NEO-PI Analog scales	Military Development grade APFT score IOCT score Psych. class grade	Mil. Dev. grade APFT score IOCT score						
<u>Phys. Abilities</u> PAE (physical aptitude exam) AAS (athletic activities)	Nelson-Denny Reading Test Spatial Abilities (Mental Rotations Test)	<i>N=50% of clss [N=466]</i>	<i>N=10 Co. [N=79]</i>	<i>N=10 Co. [N=65]</i>	<i>N=18 Co. [N=317]</i>	<i>N=15 Co. [N=26]</i>	<i>N=15 Co. [N=26]</i>	<i>N=18 Co. [N=274]</i>	<i>N=18 Co. [N=274]</i>
<u>Experience</u> H.S. rank EAS, Carcount (extra-curricular activities)	(Cadet Performance Report) CPR-superior CPR-peer CPR-instructor	CPR-superior CPR-peer CPR-instructor	CPR-superior CPR-peer CPR-instructor	CPR-superior CPR-peer CPR-instructor	CPR-superior CPR-peer CPR-instructor	CPR-superior CPR-peer CPR-instructor	CPR-superior CPR-peer CPR-instructor	CPR-superior CPR-peer CPR-instructor	CPR-peer
<u>Composites</u> LPS (leader potential score =.33AAS+.33EAS+.33FAS)	Logic Problems Social Judgment (Organizational Scenarios)	MLQ-self	MLQ-self (short form)	MLQ-self (short form)	MLQ-by sub.	MLQ-by sub.	MLQ-by sub.	MLQ-by sub.	MLQ-self (short form)
WCS (whole candidate score =.6CEER+.3LPS+.1PAE)	Problem solving (Military Scenarios) -- <i>initial scoring scheme</i>	Theory	MLQ-by subordinate (long form)	MLQ-by superior	MLQ-peer				
CIDB data (e.g., branch, demerits, etc.)	Attribute	Theory	Theory	Theory	Theory	Theory	Theory	Theory	ML
	Kegan interviews	Kegan interviews	Kegan interviews	Kegan interviews	Kegan interviews	Kegan interviews	Kegan interviews	Kegan interviews	Kegan interviews

Notes. 1. See Appendix A for a list of acronyms and the "Measures" section for further explanation of each measure.
2. Military Development grades and CPRs exist also for the summers of 1994 (two details; b1 & a2 in the dataset), 1995 (two details; b1 & b2); and 1996 (c).

Figure 1. BOLDS Sampling Scheme (adapted from Tremble, 1997)



Notes.

1. Archival/record data were planned for assembly on all Class '98 cadets for pre-entry (high school), entry (summer '94), and each academic term and summer session.
2. Blocks represent periods of data collection from or on Class '98 cadets. Beginning with Term 4, cadets were sampled by company. At periods having the same letter designation (e.g., "B"), the companies (and cadets by expectation) were the same.
3. Solid arrows indicate the cadets in the linked data collections were designed to overlap. Dashed arrows indicate that sample overlap depended on chance.

Measures

The measures collected on cadets can be classified into 10 broad categories pertaining to leader development: cognitive aptitude, complex problem-solving skills, tacit knowledge, temperament, motivation, leadership style, leadership performance, physical fitness, cognitive-emotional identity development, and developmental experiences (e.g., sports participation, military training, duty positions held).

Within these categories, more than 30 constructs were measured (see Table 7). A complete description of the measures included in BOLDS, along with their psychometric properties, will be presented in the following section. The skewness and kurtosis for each measure are listed in the body of this report; see Appendix B for the standard errors and significances of the skewness and kurtosis. Because much of the data in the ARI database consists of scale scores (i.e., composites of items) rather than individual item scores, reliability estimates could rarely be computed. Instead, an attempt was made to find relevant reliability coefficients cited in the literature.

Table 7.
BOLDS Measures by Category

Category	Instrument/Scale/Archival Data
1 Cognitive Skills & Abilities	
•General cognitive aptitude	SAT, ACT, CEER
•Vocabulary	Nelson-Denny Reading Test
•Reading comprehension	Nelson-Denny Reading Test
•Reading rate	Nelson-Denny Reading Test
•Academic performance	Psychology course grade, Military Leadership course grade, cumulative GPA and class rank
•Verbal logic	Logic Test
•Spatial ability	Mental Rotations Test (MRT)
•Writing ability	Alternate Headlines Test
•Divergent thinking	Consequences Test
2 Complex Problem-Solving Skills	
•Problem construction	Military Scenarios
•Social judgment	Organizational Scenarios
3 Tacit Knowledge of Military Leadership	Tacit Knowledge for Military Leaders – Platoon Leader Questionnaire (TKML-PLQ)

(Table continues)

Table 7 (continued).
BOLDS Measures by Category

Category	Instrument/Scale/Archival Data
4 Temperament	
ABLE scales: •Dominance, •Traditional Values, •Energy Level, •Emotional Stability, •Work Orientation, •Social Desirability, •Total	Analog scales created from items on the Student Information Form (SIF) & the Class Characteristics Inventory (CCI)
NEO-PI scales: •Agreeableness, •Conscientiousness, •Extraversion, •Neuroticism, •Openness	Analog scales created from items on the SIF & the CCI
•Hardiness	Bartone's short hardness scale
5 Motivation	
•Implicit theory of leadership	Scale based on Dweck's theory
•College goals	CCI item asking personal importance of reasons for attending USMA
•Career aspirations/intentions	CCI & SIF items
•Organizational Commitment	Meyer & Allen's Affective Commitment Scale, Penley & Gould's Calculative Scale
•Job satisfaction	Minnesota Satisfaction Questionnaire
6 Leadership Style: •Transformational, •Transactional, & •Laissez-faire leadership	Multifactor Leadership Questionnaire (MLQ)
7 Leadership Performance	Military Development grade, Cadet Performance Report
8 Physical Fitness	Pre-entry Physical Aptitude Exam (PAE), Army Physical Fitness Test (APFT), Indoor Obstacle Course Test (IOCT)
9 Cognitive-Emotional Development	Robert Kegan's identity interviews
10 Developmental Experiences	
•Athletic activities	High School Athletic Activities Score (AAS), USMA sports participation
•Extracurricular activities	High School Extracurricular Activities Score (EAS), USMA activity/club participation
•Military service or training	CCI items, USMA duty positions held
•Family influences	CCI items

Note. For references, see text.

DESCRIPTION OF MEASURES

Cognitive Skills and Abilities

Various cognitive capabilities (including general intelligence) have been shown to be associated with effective leadership (Bass, 1990). BOLDS, therefore, includes standard measures of academic aptitude (e.g., SAT/ACT, Nelson-Denny Reading Test, USMA course grades). In addition, three other basic cognitive skills were measured (verbal reasoning, spatial ability, and writing skills) because previous research indicated that these abilities enable problem solving (Tremble, 1997). One other ability – divergent thinking – was also measured, because evidence suggested it predicts performance on complex, creative problem-solving tasks (Zaccaro, Mumford, Connelly, Marks, & Gilbert, 2000).

General Cognitive Aptitude

Admission to USMA requires that cadets have an above-average high school or college academic record and relatively high performance on the Scholastic Aptitude Test (SAT) or American College Test (ACT). Among BOLDS cadets, 90% had an SAT score on record and 68% had an ACT score. These scores were obtained from USMA archives.

SAT scores on either the math or verbal subscale have a possible range of 220 to 800; thus, SAT total (sum) scores can range from about 500 to 1600. (The reliability coefficients cited in 2001 by the College Board Online are .92-.93 for 60 math questions and .91-.93 for 78 verbal questions [“Test characteristics of the SAT I,” n.d.].) Cadets’ mean SAT scores (math = 637 and verbal = 554) were higher than the 1993 national averages (math = 503 and verbal = 500) (“Mean SAT/SAT I scores for college-bound seniors,” n.d.).

ACT scores on any one subscale (e.g., math, reading) have a possible range of 1 to 36, and the ACT composite score is computed as a mean of the four subscales. As with the SAT, cadets’ ACT mean scores (ranging from 26 to 29) were higher than the 1993-94 national means, which averaged approximately 22 for each of the subscales (ACT, 2000). The *ACT Assessment: Technical Manual* (1997) lists the following median reliabilities across five national administrations during the 1995-96 academic year: Science Reasoning – .84, Math – .91, Reading – .86, English – .91, and Composite – .96.

The College Entrance Examination Rating (CEER), a measure developed by USMA, is based on high school rank and SAT or ACT scores. These scores, too, were obtained from USMA’s records. The cadets’ CEER scores correlated .71 ($p < .001$) with their SAT total scores and .78 ($p < .001$) with their ACT composite scores. Summary statistics for all of the subscales of these scholastic exams are listed in Table 8.

Table 8.
Cadets' SAT/ACT/CEER Scores

Exam Scale	<i>N</i>	Mean	<i>SD</i>	Range of Scores	25th Per-centile	50th Per-centile	75th Per-centile	Skew-ness	Kurtosis
SAT-math	909	637	63.2	440 – 790	600	640	680	-.18*	-.18
SAT-verbal	909	554	70.9	320 – 750	500	550	600	.24*	-.20
SAT-total	909	1191	113.2	760 – 1500	1110	1190	1270	.01	-.13
ACT-science reasoning	688	28.7	4.9	13 – 36	25	29	33	-.38*	-.48*
ACT-math	688	27.8	2.8	18 – 36	26	28	30	-.13	.29
ACT-reading	688	27.1	3.9	13 – 36	25	27	30	-.15	-.15
ACT-English	688	26.4	3.5	14 – 36	24	27	29	-.29*	.32
ACT-composite	688	27.5	3.0	17 – 34	25	28	30	-.35*	-.13
CEER	1006	608	51.7	434 – 771	573	609	643	.03	-.13

* $p < .05$ or $p < .01$; see Appendix B for details.

Vocabulary, Comprehension, and Reading Rate

The Nelson-Denny Reading Test is a multiple-choice test designed to measure students' vocabulary development, reading comprehension, and reading rate (Forsyth, 1978). Using the test as a diagnostic tool, USMA administers the Nelson-Denny annually to entering cadets. Based on their scores, cadets may be recommended for activities to strengthen their reading skills. These scores were obtained from USMA records.

The original test from 1960 (Forms A and B) was supplemented in 1973 with Forms C and D, reflecting slightly different subject matter and levels of difficulty. The Nelson-Denny has since been revised twice (i.e., first into Forms E and F and then into Forms G and H). The BOLDS cadets completed Form C from 1973. Forsyth (1978) cited the following alternate forms estimates of reliabilities for twelfth-graders: .91 for vocabulary, .74 for reading comprehension, and .66 for reading rate. The cadets' mean scores are reported in Table 9. Correlations among cadets' SAT/ACT, CEER, and Nelson-Denny Reading Test scores are listed in Table 10.

Table 9.
Cadets' Nelson-Denny Reading Test Scores

Exam Scale	<i>N</i>	Mean	<i>SD</i>	Range of Scores	25 th Per-centile	50 th Per-centile	75 th Per-centile	Skewness	Kurtosis
Vocabulary	1000	51.0	14.9	11-98	41	50	61	.38*	.04
Comprehension	1001	49.2	10.0	14-70	42	50	56	-.60*	.21
Reading Rate	1000	270.6	93.0	94-636	207	252	315	1.32*	2.45*

* $p < .05$ or $p < .01$; see Appendix B for details.

Table 10.
Spearman's Rho¹ Correlations Among Nelson-Denny Reading Test Scores, SAT/ACT Scores, and CEER Scores

Nelson-Denny Reading Test Scale	SAT Verbal	SAT Total	ACT English	ACT Reading	ACT Science Reasoning	ACT Total	CEER
Vocabulary	.70***	.61***	.50***	.49***	.58***	.59***	.44***
Comprehension	.56***	.54***	.48***	.49***	.57***	.59***	.45***
Reading Rate	.31***	.27***	.32***	.33***	.39***	.38***	.23***

¹ Spearman's rank correlation coefficients are cited rather than Pearson's product-moment correlations because most of the measures are skewed.

*** $p < .001$.

Academic Performance

Two USMA course grades were included in the BOLDS database: the Psychology Class grade and the Military Leadership Class grade. All cadets were required to take the general Psychology Course during their Plebe (first) year and the Military Leadership Course during their Cow (third) year. As potentially useful assessments of academic performance, cadets' final grades from these two classes were obtained from USMA records and included in BOLDS. All course grades were computed based on a maximum of 1000 points. As noted in Table 11, the mean for each course was in the low 800's, and no cadet scored lower than 611. In each case, the grades were roughly normally distributed around the mean.

Each cadet's cumulative grade point average (GPA) and final class rank also exist in USMA's files, though they have not been incorporated into ARI's database and, hence, are not reported here.

Table 11.
Cadets' Psychology and Military Leadership Course Grades

USMA Course	<i>N</i>	Mean	<i>SD</i>	Range of Grades	25 th Per-centile	50 th Per-centile	75 th Per-centile	Skew-ness	Kurt-osis
General Psychology (1 st Year)	991	810	65.7	613 – 980	763	811	857	-.01	-.53*
Military Leadership (3 rd Year)	866	828	49.0	611 – 949	798	831	862	-.36*	.38*

* $p < .05$ or $p < .01$; see Appendix B for details.

Logic Test

BOLDS researchers administered the verbal reasoning test of the Employee Aptitude Survey (EAS) to cadets from the class of 1998 during their first summer at USMA. This Logic Test consisted of six problems, each of which presented respondents with four or five “factual” statements (e.g., “All houses on Elm Street are rented”) followed by five conclusions (e.g., “Myer rents his house”). Based on the “facts,” respondents were to indicate whether each conclusion was “definitely true,” “definitely false,” or “uncertain.” Cadets were given five minutes to complete the test. See Table 12 for descriptives. According to the EAS Technical Manual (second edition), the alternate form reliability estimate for the verbal reasoning test is 0.82 (Ruch, Stang, McKillip, & Dye, 1994).

Table 12.
Cadets' Logic Test Scores

Administration Date	<i>N</i>	Mean	<i>SD</i>	Range of Scores	25 th Per-centile	50 th Per-centile	75 th Per-centile	Skew-ness	Kurt-osis
Summer 1994	995	28.0	5.93	3 – 45	24	29	32	-.56*	.85*

* $p < .05$ or $p < .01$; see Appendix B for details.

Mental Rotations Test

During their initial summer at USMA, cadets also completed the Mental Rotations Test (MRT) for the BOLDS project. This test essentially assessed a cadet's ability to recognize a given object when it is depicted from different angles, i.e., three-dimensional spatial visualization (Vandenberg & Kuse, 1978). The MRT presented a series of drawings of three-dimensional objects (resembling Rubik's Cube pieces), each of which was followed by four other drawings. Two of the four “follow-up” drawings were the same as the original object but pictured from a different angle. Respondents were asked to determine which two drawings represented the original object. For a sample of over 3,200 adults and adolescents (aged 14 and

older), the Kuder-Richardson 20 estimate of reliability was .88 (Wilson, et al., 1975, as cited in Vandenberg & Kuse, 1978).

The MRT was composed of two parts, each consisting of 10 problems. Respondents were given three minutes to complete the first part and three minutes to complete the second part. Because scoring of the test reflected both correct and incorrect responses, it was not advantageous for respondents to guess randomly. For descriptives, see Table 13.

Table 13.
Cadets' Mental Rotations Test Scores

Administration Date	N	Mean	SD	Range of Scores	25 th Per-centile	50 th Per-centile	75 th Per-centile	Skew-ness	Kurt-osis
Summer 1994	995	19.5	8.5	0 - 38	13	20	26	-.05	-.67*

* $p < .05$ or $p < .01$; see Appendix B for details.

Alternate Headlines Test

BOLDS researchers administered the Alternate Headlines Test to cadets during their first summer at USMA and again during their third year. This test was used to measure cadets' writing ability (Guilford & Hoepfner, 1966, 1971), with the intent that it could be used as a covariate for the "constructed response measures" used to assess cadets' problem-solving abilities.³ In other words, researchers wanted to be able to control for cadets' writing ability in examining their problem-solving skills. The Alternate Headlines Test presents 10 newspaper headlines (e.g., "Planes collide over ocean, killing three") and asks respondents to rewrite each headline, using different words but maintaining its essential meaning. Cadets were given 10 minutes to complete the test.

Dela Rosa et al. (1997) recommended that the rewritten headlines be scored for *meaning* (the extent to which the rewrite preserves the original meaning), *presentation* (the extent to which the rewrite is grammatically correct and in headline format), and *creativity* (the extent to which the rewrite is imaginative, uses different words, and extrapolates from the original meaning). They reported the following ranges of coefficient alphas: .68 to .81 for the Meaning scale, .60 to .67 for the Presentation scale, and .84 to .89 for the Creativity scale.

From these three scales evolved two overall scores for analysis: Writing Skill (the mean of the raters' mean presentation and meaning ratings) and Creativity (the mean of the raters' mean creativity ratings). For the Writing Skill score, Dela Rosa et al. (1997) found that interrater reliability ranged from .78 to .90 for three raters and .64 to .90 for two raters. For the Creativity

³ Constructed response measures involve tasks that require participants to generate and express their own responses rather than recognize correct answers from among prescribed choices. As part of BOLDS, cadets were asked to complete four constructed response instruments: Alternate Headlines, Consequences, and two measures of complex problem solving (as discussed in a subsequent section).

score, interrater reliability ranged from .89 to .92 for three raters and .80 to .91 for two raters. Because the cadets' responses on this test have not yet been scored, there are no data to report at this time.

Consequences Test

The Consequences instrument was developed by Guilford and Guilford (1980) to assess divergent thinking skills and provide a standardized measure of creativity. Cadets were presented with five hypothetical situations (e.g., "What would be the results if the force of gravity was suddenly cut in half?"). For each question, they were given two minutes to list as many *consequences* as they could.

According to the revised scoring scheme proposed by Dela Rosa et al. (1997), each response was scored as "obvious," "remote," "duplicate," or "irrelevant/unratable." "Obvious" responses were considered to be those directly resulting from the situation presented. Responses that differed from the material presented and referred to indirect results were scored as "remote." "Duplicate" responses were those that restated a previously listed idea. And, responses that did not appear to be germane to the situation, that were so brief as to be uninterpretable, or that seemed to be sarcastic were considered "irrelevant." The scoring system results in two distinct scores. The sum of the obvious responses is the *Ideational Fluency* score, and the sum of the remote responses is the *Originality* score.

Dela Rosa et al. (1997) reported that the interrater reliability for the Ideational Fluency score ranged from .82 to .92 for three raters and .67 to .92 for two raters. Interrater reliabilities for the Originality score ranged from .86 to .94 for three raters and .77 to .93 for two raters. In the BOLDS database, each cadet's responses were coded by only one rater, so interrater reliability coefficients could not be determined.

The Consequences instrument was administered by BOLDS researchers to four samples of cadets, during the fourth, fifth, sixth, and eighth terms. Descriptive statistics regarding their scores from each of these terms are noted in Table 14. Overall, cadets provided more remote than obvious responses. Duplicate and irrelevant responses, on the whole, were infrequent. Aside from the duplicate responses, the range of scores was fairly large each term.

Scores from the four administrations were collapsed, and means were calculated for cadets who had completed the Consequences measure more than once. Among these totals ($N = 679$), the mean number of obvious responses was positively correlated with the mean number of remote responses ($r = .10, p < .05$).

Table 14.
Cadets' Scores on the Consequences Test

Administration Date	<i>N</i>	Mean	<i>SD</i>	Range of Scores	25 th Percentile	50 th Percentile	75 th Percentile	Skewness	Kurtosis
Obvious Responses									
Term 4 - Spr '96	155	11.8	5.2	1 - 29	8	11	15	.52*	.40
Term 5 - Fall '96	314	10.8	5.5	0 - 31	7	10	14	.81*	.95*
Term 6 - Spr '97	306	11.1	5.6	0 - 33	7	11	14	.80*	1.19*
Term 8 - Spr '98	256	11.4	6.4	0 - 36	7	10.5	15	.87*	.99*
Remote Responses									
Term 4 - Spr '96	155	16.7	7.1	0 - 37	11	16	21	.41*	.37
Term 5 - Fall '96	314	14.3	7.1	0 - 42	9	14	18	.86*	1.39*
Term 6 - Spr '97	306	14.3	7.0	0 - 41	10	13.5	18	.89*	1.44*
Term 8 - Spr '98	256	12.2	7.6	0 - 45	7	12	16	.99*	1.74*
Duplicate Responses									
Term 4 - Spr '96	155	1.0	1.5	0 - 9	0	1	2	2.32*	7.98*
Term 5 - Fall '96	314	0.8	1.3	0 - 8	0	0	1	2.52*	7.92*
Term 6 - Spr '97	306	1.0	1.4	0 - 9	0	0	1	2.16*	6.53*
Term 8 - Spr '98	256	1.3	2.2	0 - 20	0	1	2	3.75*	22.74*
Irrelevant Responses									
Term 4 - Spr '96	155	1.3	2.2	0 - 21	0	1	2	5.92*	48.23*
Term 5 - Fall '96	314	1.3	1.9	0 - 15	0	1	2	2.96*	13.12*
Term 6 - Spr '97	306	1.8	3.3	0 - 39	0	1	2	6.35*	59.31*
Term 8 - Spr '98	256	2.0	3.6	0 - 25	0	1	2	3.14*	11.64*

* $p < .05$ or $p < .01$; see Appendix B for details.

Complex Problem-Solving Skills

Applying a capability model of leadership, Mumford et al. (1993) proposed that a leader's effectiveness could be predicted by his/her ability to solve complex and ill-defined organizational problems. This conceptualization bridges the cognitive abilities, temperament characteristics, and interpersonal skills required for effective leadership. To test this conceptualization, Mumford et al. (1993) developed assessment instruments to measure such problem-solving skills. Rather than allowing respondents to select answers from predetermined alternatives, the instruments force respondents to formulate their own appropriate solutions. Known as constructed response tasks, two of these problem-solving measures were included in the battery of tests and surveys that cadets completed for the BOLDS project: Military Scenarios and Organizational Scenarios.

Military Scenarios

The Military Scenarios instrument was intended to assess solution construction skills. Respondents were provided with two scenarios asking them to take the role of a military officer confronting a complicated situation. Each scenario was followed by three questions:

1. If you were placed in this situation, what would be the most important problem for you to address?
2. What key pieces of information would you need to solve the problem?
3. What other problems would you have to consider?

The questions attempted to elicit information about how well individuals identify a situation's key parameters and constraints that impact the construction of an effective solution. Cadets were given 10 minutes to respond to both scenarios.

Responses to the first administration of this instrument were scored using eight five-point scales that tapped various aspects of problem solving, such as attention to restrictions, nature of goals (e.g., impact on self and on organization), short- versus long-term implications, originality, quality, objectivity, and number of alternatives. An individual's final score was computed by averaging the scales across both scenarios and across three or four trained raters (see Table 15). Reliability for this measure was estimated by the correlation between the two scenario scores (for cadets who received ratings on all eight scales for both scenarios): .31 (.47 stepped up; $N = 939$).

As a result of a review of this scoring scheme by Dela Rosa et al. (1997), later administrations of the Military Scenarios instrument were scored by giving each scenario a single problem-construction rating based on a seven-point scale, and then combining scores across both scenarios.

The points along the seven-point scale were described as follows:

- 1 = Response focuses on some of the considerations explicitly cited in the scenario description without detailing elements of those considerations.
- 2 = Response identifies all the key considerations explicitly cited in the scenario description.
- 3 = Response identifies a relevant consideration not cited in the scenario.
- 4 = Response identifies all the key considerations explicitly cited in the scenario description and provides an explicit discussion of how these considerations relate to the solving of the problem.
- 5 = Response identifies considerations not cited in the scenario.
- 6 = Response identifies all the key considerations explicitly cited in the scenario description, as well as considerations not cited in the scenario.
- 7 = Response provides an explicit discussion of how these considerations relate to the solving of the problem.

Incomplete responses were rated "0" and were considered missing data for purposes of our analyses. Only one trained rater scored each cadet's responses.

Again, reliability for the measure was estimated by the correlation between the two scenario scores. Across the four administrations of the instrument from term 4 through term 8, the correlations ranged from .41 to .49 (.58 to .66 stepped up), with a mean of .47 (.64 stepped

up). Dela Rosa et al. (1997) cited a similar correlation of .45 and suggested that because it was based on only two items this moderate correlation is reasonable.

Table 15.
Cadets' Problem-Construction (Military Scenarios) Scores

Administration Date	N	Mean	SD	Range of Scores	25 th Percentile	50 th Percentile	75 th Percentile	Skewness	Kurtosis
Summer 1994 ¹	990	2.0	.22	1.4 – 2.9	1.9	2.0	2.1	.78*	1.04*
Term 4 - Spr '96	119	3.6	.85	1.5 – 6.0	3.0	3.5	4.0	.11	-.12
Term 5 - Fall '96	337	3.2	.85	1.0 – 5.5	2.5	3.0	4.0	-.08	-.06
Term 6 - Spr '97	300	3.2	.86	1.0 – 6.0	2.5	3.0	4.0	-.09	.10
Term 8 - Spr '98	247	3.3	.89	1.0 – 6.0	2.5	3.0	4.0	-.05	.05

¹ Scoring of the responses to the Military Scenarios changed after the first administration.

* $p < .05$ or $p < .01$; see Appendix B for details.

Organizational Scenarios

In addition to understanding significant aspects of a situation, effective organizational problem solving also requires understanding people and social systems. To assess such social judgment skills, cadets were presented with two organizational scenarios, each conveying a complex situation with negative outcomes that resulted from a leader's inability to attend to conflicting social cues. Each scenario was followed by three questions:

1. Why did this situation occur?
2. What was the central mistake made by the Pharmacologist (Scenario #1) / sales director (Scenario #2)?
3. As this situation now exists, what would you do if you were the Pharmacologist (Scenario #1) / sales director (Scenario #2)?

Respondents were given 10 minutes to read both scenarios and respond to all six questions. Four trained raters evaluated the responses in terms of five-point scales measuring self-objectivity, self-reflection, sensitivity to fit, judgment under uncertainty, systems perception, systems commitment, and overall social judgment skill. A single mean rating was calculated for each cadet based on the scores from both scenarios and all raters (see Table 16). The reliability of this measure was estimated by correlating the two scenario scores. Among all cadets who received eight scale scores for both scenarios ($N = 930$), regardless of the number of raters involved in the scoring, the correlation was .41 (.58 stepped up).

Table 16.
Cadets' Social Judgment (Organizational Scenarios) Scores

Administration Date	<i>N</i>	Mean	<i>SD</i>	Range of Scores	25 th Percentile	50 th Percentile	75 th Percentile	Skewness	Kurtosis
Summer 1994	994	2.8	.30	2.0 – 4.2	2.6	2.8	3.0	.35*	.51*

* $p < .05$ or $p < .01$; see Appendix B for details.

Tacit Knowledge of Military Leadership

Tacit knowledge refers to the practical, action-oriented knowledge that Army leaders typically acquire from experience. The Tacit Knowledge for Military Leaders – Platoon Leader Questionnaire (TKML-PLQ) is a survey designed to measure this knowledge. The original instrument consisted of 16 scenarios, each describing a situation encountered by military leaders. Following each scenario were several options (7 to 15) for how to handle the situation. Using a scale of 1 ("extremely bad") to 9 ("extremely good"), cadets were to rate the quality of each option for achieving the goal or solving the problem. Hedlund et al. (1998) reported a coefficient alpha of .68 for this 16-item instrument.⁴

BOLDS researchers administered the original 16-item TKML-PLQ to 307 cadets during their 7th term at USMA. Each cadet's response pattern (i.e., ratings for all the options) was correlated with the mean ratings given by "experts" (i.e., experienced Army majors). The resulting correlations can be considered scores indicating how closely each cadet's understanding resembles that of experienced officers. The distribution of such correlations ranged from .05 to .82 and was negatively skewed. The median correlation was .68 (see Table 17).

Table 17.
Cadets' Correlations With the Experts' Ratings on the Tacit Knowledge for Military Leaders – Platoon Leader Questionnaire (TKML-PLQ)

Administration Date	<i>N</i>	Mean	<i>SD</i>	Range of Correlations	25 th Percentile	50 th Percentile	75 th Percentile	Skewness	Kurtosis
Term 7 - Fall '97	307	.64	.15	.05 – .82	.60	.68	.73	-1.83*	3.31*

* $p < .05$ or $p < .01$; see Appendix B for details.

⁴ One item was eventually dropped because of its low correlation with the inventory as a whole, and Hedlund et al. (1998) cited the internal consistency as .69 for the 15-item revised TKML-PLQ.

Temperament

ABLE and NEO-PI Analog Scales

Certain personality dimensions have been found to be associated with leadership effectiveness (Hogan, Curphy, & Hogan, 1994) and, therefore, could be useful predictors in BOLDS research. Unfortunately, due to constraints placed on cadets' time, general personality measures were not administered to cadets in the class of 1998. In their place, Evans (1997) developed analog scales, using several items from the Astin Student Information Form (SIF) and USMA's Class Characteristics Inventory (CCI), to estimate the personality constructs measured by the Assessment of Background and Life Experiences (ABLE; Hough, Eaton, Dunnette, Kamp, & McCloy, 1990) and the NEO Personality Inventory (NEO-PI; Costa & McCrae, 1985). In other words, Evans (1997) empirically developed scales comparable to the ABLE and NEO-PI, using items in the SIF and CCI, which are surveys routinely administered by USMA.

The ABLE is a temperament measure intended to capture the motivational aspect of predicting performance as opposed to the ability aspect: that is, what soldiers "will do" on the job versus what they "can do." As part of an earlier research project, an 88-item version of the ABLE was assembled for USMA and administered to cadets from the class of 1994. This short form included five content scales (Dominance, Traditional Values, Energy Level, Emotional Stability, Work Orientation); one response validity scale (Social Desirability); and an ABLE total score, described by White, Nord, Mael, and Young (1993) as measuring adaptability. Evans (1997) sought archival predictors of the ABLE scale scores from among CCI and Astin SIF survey items administered to the class of 1994. Using these same items for the class of 1998, ABLE analog scale scores were computed for the BOLDS cadets (see Table 18).

Table 18.
Cadets' Scores on the ABLE Analog Scales

ABLE Analog Scale	<i>N</i>	Mean	<i>SD</i>	Range of Scores	25th Per- centile	50th Per- centile	75th Per- centile	Skew- ness	Kurt- osis
Dominance	783	2.5	.23	1.7–3.0	2.4	2.5	2.7	-.32*	-.05
Traditional Values	640	2.5	.19	1.7–2.9	2.4	2.6	2.7	-.77*	.78*
Energy Level	735	2.3	.19	1.5–2.8	2.2	2.3	2.5	-.49*	.61*
Emotional Stability	695	2.3	.19	1.6–2.8	2.2	2.3	2.5	-.30*	.45*
Work Orientation	818	2.3	.25	1.4–2.9	2.2	2.3	2.5	-.38*	.29
Social Desirability ¹	711	1.4	.12	1.0–1.7	1.3	1.4	1.5	-.17	.09
ABLE Total	695	2.4	.16	1.8–2.8	2.3	2.4	2.5	-.41*	.34

¹ This is a response validity scale to detect socially desirable responding (i.e., faking).

**p* < .05 or *p* < .01; see Appendix B for details.

Following the same process he used with the ABLE, Evans (1997) constructed analog scales for the NEO-PI, using data from the USMA class of 1996, because that class had completed the NEO-PI. Each of the five scales of the NEO-PI measures one of the "Big Five"

personality dimensions (Costa & McCrae, 1985): Agreeableness, Conscientiousness, Extraversion, Neuroticism, and Openness to Experience. The BOLDS cadets' analog scale scores are presented in Table 19. Using BOLDS data, Milan (in press) was able to replicate Evans' (1997) results and Mael and White's (1994) results, suggesting that these ABLE and NEO-PI analog scales are consistent measures of cadet temperament.

Table 19.
Cadets' Scores on the NEO-PI Analog Scales

NEO-PI Analog Scale	<i>N</i>	Mean	<i>SD</i>	Range of Scores	25 th Percentile	50 th Percentile	75 th Percentile	Skewness	Kurtosis
Agreeableness	800	107	8.7	82 – 134	101	107	113	.06	-.19
Conscientiousness	691	117	13.1	70 – 147	108	118	126	-.47*	.35
Extraversion	754	120	11.0	80 – 143	112	120	127	-.24*	-.15
Neuroticism	781	91	14.3	59 – 140	80	90	100	.38*	.10
Openness	782	111	12.6	81 – 170	102	109	119	.60*	.79*

* $p < .05$ or $p < .01$; see Appendix B for details.

Hardiness

As a personality dimension, hardiness refers to that "pervasive and steady sense of commitment, control, and challenge" (Bartone, 1999a) and has been shown to moderate the ill effects of stress (Bartone, 2000). Compared to individuals who are low on hardiness, hardy persons have a higher sense of life and work commitment, a greater feeling of control, and more openness to change and challenges in life (Bartone, 1999a).

During the 8th term, a short hardiness scale developed by Bartone (1995) was disseminated to a sample of cadets through e-mail. The 15-item scale included both positively and negatively keyed items associated with the three conceptual facets of hardiness: commitment, control, and challenge. Each of the 15 items was a general statement about life (e.g., "Changes in routine are interesting to me"). Cadets were to indicate on a four-point scale how true they felt each statement was ("not at all true" to "completely true").

According to Bartone (1999b), Cronbach's coefficient alpha for the total hardiness measure was .82 (.77 for commitment, .68 for control, and .69 for challenge) in a sample of 787 Army National Guard and reservists in medical units mobilized for the Gulf War. Among 105 USMA cadets, the three-week test-retest reliability coefficient for the total hardiness scale was .78 (Bartone, 1999b).

The scale was completed and returned through e-mail by 430 cadets. As a group, their hardiness scores ranged from 11 to 42 (out of a possible range of 0 to 45), with a mean of 30.8 ($SD = 4.65$) and a median of 31.0 (see Table 20). As shown in Table 21, cadets' hardiness scores were significantly correlated with some of the ABLE and NEO-PI analog scales.

Table 20.
Cadets' Hardiness Scores

Administration Date	N	Mean	SD	Range of Scores	25 th Percentile	50 th Percentile	75 th Percentile	Skewness	Kurtosis
Term 8 - Spr '98	430	30.8	4.65	11 – 42	28.0	31.0	34.0	-.22	.27

Table 21.
Correlations (Spearman's Rho) Between Hardiness and the ABLE and NEO-PI Analog Scales

ABLE Analog Scale	N	Correlations between Hardiness and ABLE Scale	NEO-PI Analog Scale	N	Correlations between Hardiness and NEO-PI Scale
ABLE Total	300	.28***	Neuroticism	341	-.24***
Emotional Stability	300	.24***	Conscientiousness	297	.21***
Energy Level	319	.24***	Extraversion	328	.14*
Dominance	342	.16**	Agreeableness	346	.09
Traditional Values	274	.14*	Openness	347	.05
Work Orientation	362	.09			
Social Desirability	309	.09			

* $p < .05$. ** $p < .01$. *** $p < .001$.

Motivation

Implicit Theories of Leadership

According to Dweck, Chiu, and Hong (1995), “implicit theories refer to the two different assumptions people may make about the malleability of personal attributes” (p. 267). For example, with respect to leadership, some individuals may regard leadership ability as a fixed trait or static characteristic (“entity theory”), whereas others may believe leadership is a changeable characteristic, amenable to development (“incremental theory”). The theory individuals hold impacts how they construe events, their reactions to achievement setbacks, and their inclinations to engage in self-development.

BOLDS researchers measured cadets’ implicit theories of leadership using four items, based on measures originally developed by Dweck and her colleagues (Dweck, Chiu, & Hong, 1995).⁵ Each item was a statement describing a belief about the general nature of leadership (e.g., “Not everyone is born with the same ability for leadership, and these differences will

⁵ Because implicit theory is a unitary idea, four items were deemed adequate (Gorenflo-Gilbert, 1997; Dweck, Chiu, & Hong, 1995).

persist throughout an individual's life"). For each of the four statements, cadets indicated their agreement on a six-point scale ranging from "strongly agree" (1) to "strongly disagree" (6). The mean of the four items is interpreted as an overall implicit theory score.

Between the third and seventh terms, a sample of cadets completed the implicit theory items each term; their mean scores by item are shown in Table 23. For each item during each term, ratings ranged across the entire spectrum from "strongly agree" to "strongly disagree," though the percentage of cadets who strongly disagreed tended to be relatively small in each case. As shown in the table, the wording of item #3 ("Not everyone is born with the same ability for leadership, and these differences will persist throughout an individual's life") elicited stronger agreement (i.e., lower score) than did that of item #1 ("Leadership ability is something very basic about an individual, and this ability can't be changed very much"). Cronbach's alpha averaged .77 over the four administrations of the scale, as noted in Table 22.

Table 22.
Cadets' Mean Scores on the Individual Implicit Theory Items

Administration Date	N	Item 1	Item 2	Item 3	Item 4	Cronbach's Alpha
Term 3 - Fall '95 ¹	—	—	—	—	—	—
Term 4 - Spr '96	174	3.28 (1.53)	3.09 (1.39)	2.43 (1.29)	2.58 (1.36)	.79
Term 5 - Fall '96	296	3.25 (1.48)	3.01 (1.34)	2.38 (1.21)	2.56 (1.23)	.77
Term 6 - Spr '97	440	3.24 (1.43)	2.95 (1.34)	2.55 (1.34)	2.76 (1.33)	.79
Term 7 - Fall '97	188	3.55 (1.51)	3.05 (1.39)	2.48 (1.34)	2.53 (1.26)	.73

Note. Standard deviations are shown in parentheses.

¹ Data from Fall 1995 were not available.

Overall implicit theory scores are displayed in Table 23. As the 75th percentile falls on the midpoint of the scale, approximately three-quarters of cadets agreed to some degree with the implicit theory items; hence, they held an "entity" view of leadership ability. Conversely, about one-quarter of cadets disagreed with the statements and, thus, endorsed an "incremental" theory of leadership.

Table 23.
Cadets' Overall Implicit Theory of Leadership Mean Scores

Administration Date	N	Mean	SD	Range of Scores	25 th Per-centile	50 th Per-centile	75 th Per-centile	Skew-ness	Kurtosis
Term 3 - Fall '95 ¹	-	-	-	-	-	-	-	-	-
Term 4 – Spr '96	174	2.8	1.1	1.0 – 5.8	2.0	2.75	3.5	.37*	-.33
Term 5 - Fall '96	296	2.8	1.0	1.0 – 6.0	2.0	2.75	3.5	.34*	-.17
Term 6 – Spr '97	440	2.9	1.1	1.0 – 6.0	2.0	2.75	3.5	.51*	-.08
Term 7 - Fall '97	188	2.9	1.0	1.0 – 6.0	2.25	2.75	3.7	.35*	-.21

¹ Data from Fall 1995 were not available.

* $p < .05$ or $p < .01$; see Appendix B for details.

Reasons for Attending USMA and Cadets' Academic Aspirations

On the Class Characteristics Inventory (CCI), which was administered by USMA during the cadets' first summer at West Point, cadets were given a list of 10 possible reasons why people seek an appointment to USMA and asked to indicate how important each reason was to them personally. The survey directions instructed respondents to "consider all reasons given before choosing" the "number one priority or most important consideration." All 10 reasons are listed in Table 24, rank ordered according to total percentage of cadets choosing "most important consideration" or "a major consideration."

The third, fourth, and fifth reasons listed are of particular interest to the BOLDS project. As shown, personal self-development and leadership training were considered a major consideration or the most important consideration by three-quarters of cadets (79% and 76%, respectively), and nearly one-quarter of cadets chose "Desire to be an Army officer" as their most important consideration for attending USMA (23%). Cadets remaining during the seventh term showed roughly the same distribution of choices.

As noted in Table 25, of the incoming BOLDS cadets, two-fifths planned to pursue a Ph.D. or Ed.D. degree (40%), and another two-fifths anticipated getting a Master's degree (39%).

Table 24.
Percent of Cadets Indicating the Priority of Reasons To Attend USMA

Reason to attend USMA ¹	A. Most important consider- ation	B. A major consider- ation	A + B	C. A factor but not a major consider- ation	D. A minor consider- ation	E. Irrelevant or not applicable
1) Quality of academic program (N=1004)	17	73	90	8	1	1
2) USMA's overall reputation (N=1001)	28	58	86	12	2	1
3) Personal self-development (N=1002)	20	59	79	17	4	1
4) Leadership training (N=1004)	12	64	76	19	4	1
5) To be an Army officer (N=1003)	23	41	64	22	11	3
6) Quality of physical development program (N=1002)	3	41	44	35	14	7
7) Quality of inter-collegiate athletic program (N=1002)	4	30	34	30	22	15
8) Inexpensive college education (N=1003)	2	27	29	34	19	18
9) Family influence (N=1001)	3	22	25	36	22	17
10) Economic necessity (N=1004)	3	13	16	17	21	45

¹ Source: Class Characteristics Inventory – Class of 1998.

Table 25.
Cadets' Academic Aspirations

Highest degree anticipating ¹	% 1 st Term Fall '94 (N = 1006)	% 7 th Term Fall '97 (N = 859)
Bachelor's	7	7
Master's	39	40
Ph.D./Ed.D.	40	39
Other/missing ²	14	14

¹ Source: Astin 1994 Student Information Form.

² This group includes all other response categories (e.g., vocational, Associate's, MD, DDS, law, divinity) and missing data.

Career Intentions

As noted in Table 26, upon beginning their West Point careers, one-fifth of cadets planned to stay in the Army until retirement (21%), whereas two-fifths were undecided about staying beyond their six-year obligation (41%). Cadets whose parents were on active duty or retired from the military were more likely than others to indicate they planned to stay in the Army until retirement, as shown in Table 27. For a comparison of cadets' career intentions with the intentions expressed by 2LTs and 1LTs in 1992 and 1996, see Table 28.

Table 26.
Cadets' Career Plans

Career intent¹	% 1st Term Fall '94 (N = 938)	% 7th Term Fall '97 (N = 801)
Stay in Army until retirement	21	21
Unsure I'll stay until retirement	28	28
Unsure I'll stay beyond obligation	41	42
Probably leave after obligation	7	7
Definitely leave after obligation	3	2

¹ Source: Class Characteristics Inventory – Class of 1998.

Table 27.
Difference in Cadets' Career Intent Based on Having Parents in the Military

Career Intentions Upon Entering USMA	% Cadets with Military Parents (N = 202)	% Other Cadets (N = 713)	% All BOLDS Cadets (N = 915)
Plan to stay in Army until retirement	29	18	20
Plan to stay beyond obligation but undecided about staying until retirement	28	28	28
Undecided about staying beyond 6-year obligation	35	43	41
Probably leave Army upon completion of obligation	6	7	7
Definitely leave Army upon completion of obligation	2	3	3

$\chi^2(4, N = 915) = 12.307, p < .05$.

Table 28.
Career Intentions of Lieutenants in 1992 and 1996¹

Career Intent	% 2 LTs 1992	% 1 LTs 1992	% BOLDS Cadets 1994	% 2 LTs 1996	% 1 LTs 1996
Plan to stay in Army until retirement	16	31	21	20	20
Plan to stay beyond obligation but undecided about staying until retirement	24	22	28	22	25
Undecided about staying beyond 6-year obligation	28	19	41	28	21
Probably leave Army upon completion of obligation	19	12	7	16	18
Definitely leave Army upon completion of obligation	13	16	3	14	17

¹ The 1992 data were collected as part of the Longitudinal Research on Officer Careers (LROC), and the 1996 data are from the Survey of Officer Careers (SOC).

Organizational Commitment and Job Satisfaction

Among the instruments administered by BOLDS researchers during the cadets' eighth term at USMA were two measures of organizational commitment: Meyer and Allen's (1997) Affective Commitment Scale (composed of eight items, coefficient alpha = .85) and Penley and Gould's (1988) Calculative Commitment Scale (composed of five items, coefficient alpha = .67). The items (which typically use the words "this organization") were modified to refer directly to the Army: for instance, "I do not feel a strong sense of belonging to *the Army*." In addition, 15 items modified from the Minnesota Satisfaction Questionnaire were administered to measure cadets' current "job" satisfaction (Weiss, Dawis, England, & Lofquist, 1967; coefficient alpha = .91 for the corresponding 20-item scale used by Green, 2000). Because none of these data are available in the ARI database, they are not described further in this report.

Cadets' Leadership Styles

Beginning in the second year, the Multifactor Leadership Questionnaire (MLQ; Bass & Avolio, 1991) was administered by BOLDS researchers to a sample of cadets each subsequent term. This instrument measures three leadership styles (transformational leadership, transactional leadership, and laissez-faire leadership) and two outcomes of leadership (extra effort by followers and satisfaction with leader).

The transformational leadership style is associated with five subsets of behaviors: *idealized influence* (living one's ideals), *inspirational motivation* (inspiring others), *intellectual stimulation* (encouraging new ways of thinking), *individualized consideration* (coaching and developing associates based on their unique capabilities and needs), and *attributed charisma* (earning respect) (Bullis, Kane, & Tremble, 1997). In general, transformational leaders attempt to increase their associates' awareness of what is right and important and move them beyond their own self-interests for the good of the group. The transactional leadership style, in contrast, is demonstrated when a leader rewards or punishes associates based on their performance. Transactional leaders rely on *contingent reward* (setting expectations for performance and rewards for satisfactorily completing assignments) and *management-by-exception* (which can be an *active* monitoring for errors or a *passive* waiting for mistakes to occur). *Laissez-faire* leadership refers to the absence or avoidance of leadership behaviors.

The MLQ was first administered in the third term using the original instrument, which consisted of 81 items (Bass & Avolio, 1991). Thereafter, a shorter 39-item version was administered (Avolio, Bass, & Jung, 1996). Both instruments consisted of statements describing a way in which a person could behave as a leader. The respondents used a five-point scale (ranging from "frequently if not always" to "not at all") to indicate their perceptions of how frequently the person in question displayed the behavior described. Different forms of the instrument exist, such that individuals could rate themselves, their leaders, or their subordinates. Although data were collected from self, supervisor, subordinates, peers, and USMA instructors, only the self-scores and peer scores are available in the ARI database.

On the short MLQ, each of the nine scales described above (italicized) was represented by four items. (After having been re-coded, higher scores indicate a more frequently displayed behavior; specifically: 1 = not at all, 2 = once in a while, 3 = sometimes, 4 = fairly often, 5 = frequently, if not always.) The mean of the four items is considered the scale score. Reliability coefficients for each scale are reported in Table 29. Overall, these alphas are slightly lower than the range (.73 to .89) cited by Bass (1996) for eight of the scales (excluding the *attributed charisma* scale) derived from the 70-item MLQ-Form 5.

Table 29.
Reliability Coefficients for MLQ Scales

MLQ Scale	Cronbach's Alpha (Range) ¹ for Self Ratings	Cronbach's Alpha for Peer Ratings ²
Transformational Leadership		
Idealized Influence	.61 - .69	.75
Inspirational Motivation	.66 - .75	.83
Intellectual Stimulation	.61 - .72	.84
Individualized Consideration	.54 - .67	.69
Attributed Charisma	.59 - .72	.81
Transactional Leadership		
Contingent Reward	.49 - .67	.76
Mgmt-by-Exception (Active)	.59 - .67	.74
Mgmt-by-Exception (Passive)	.65 - .73	.72
Laissez-Faire Leadership	.62 - .75	.80

¹ The range represents the highest and lowest alphas across terms 4 through 8.

² Peer ratings were gathered during Term 8.

Table 30 presents the cadets' mean self-scores (and peer scores for term 8) for the transformational behavior scales, and Table 32 shows the means for the transactional and laissez-faire leadership scales. The differences in mean self-scores were minimal across the transformational scales, with cadets rating themselves slightly higher on individualized consideration than on intellectual stimulation during terms 4, 5, 6, and 7 (Wilcoxon Signed Ranks Tests significant at a $p < .001$ level). In contrast, among the transactional behaviors, cadets rated themselves relatively high on contingent reward (mean of 4.1 across terms 4 through 8) and relatively low on passive management-by-exception (mean of 2.4 across the five terms; see Table 31). Overall, cadets indicated they least frequently engaged in laissez-faire leadership behaviors.

Table 30.
Mean Scores on Transformational Behaviors as Rated by Self and Peers

Administration Date	Idealized Influence	Inspirational Motivation	Intellectual Stimulation	Individualized Consideration	Attributed Charisma
Self					
Term 3 - Fall '95 ¹	—	—	—	—	—
Term 4 - Spr '96	4.05 (0.64)	4.08 (0.64)	3.90 (0.61)	4.21 (0.53)	4.13 (0.54)
Term 5 - Fall '96	3.98 (0.65)	3.96 (0.63)	3.95 (0.56)	4.15 (0.53)	4.09 (0.59)
Term 6 - Spr '97	4.00 (0.66)	4.03 (0.65)	3.97 (0.61)	4.13 (0.56)	4.04 (0.57)
Term 7 - Fall '97	3.98 (0.66)	4.10 (0.65)	3.97 (0.60)	4.14 (0.54)	4.06 (0.58)
Term 8 - Spr '98	3.77 (0.65)	3.84 (0.62)	3.82 (0.58)	3.85 (0.65)	3.87 (0.60)
Peers					
Term 8 - Spr '98	3.33 (0.87)	3.49 (0.92)	3.23 (0.94)	3.23 (0.87)	3.43 (0.94)

Note. Standard deviations are shown in parentheses.

¹Data from Fall 1995 were not available.

Table 31.
Mean Scores on Transactional Behaviors and Laissez-Faire Leadership as Rated by Self and Peers

Administration Date	Contingent Reward	Active Mgmt-by-Exception	Passive Mgmt-by-Exception	Laissez-Faire Leadership
Self				
Term 3 - Fall '95 ¹	—	—	—	—
Term 4 - Spr '96	4.23 (0.55)	2.81 (0.74)	2.34 (0.72)	1.79 (0.65)
Term 5 - Fall '96	4.13 (0.59)	2.97 (0.69)	2.32 (0.71)	1.82 (0.65)
Term 6 - Spr '97	4.11 (0.56)	3.04 (0.70)	2.38 (0.75)	2.48 (0.81)
Term 7 - Fall '97	4.14 (0.56)	2.91 (0.75)	2.43 (0.74)	1.86 (0.71)
Term 8 - Spr '98	3.95 (0.55)	2.87 (0.67)	2.43 (0.68)	1.95 (0.65)
Peers				
Term 8 - Spr '98	3.33 (0.89)	2.84 (0.87)	2.57 (0.86)	2.35 (0.92)

Note. Standard deviations are shown in parentheses.

¹Data from Fall 1995 were not available.

A total score for transformational leadership was computed by calculating the mean of the five behavior scales representing transformational leadership (see Table 32). Past research has found these behaviors to be highly correlated, so a total transformational score is meaningful (Bullis, Kane, and Tremble, 1997).

A similar total score for transactional leadership was not calculated because previous research into the structure of the MLQ has not supported the independence of this construct. Specifically, the three associated behaviors of transactional leadership (i.e., contingent reward, active management-by-exception, and passive management-by-exception) relate differently to the other two leadership styles. For instance, Bullis, Kane, and Tremble (1997) and Tisak (1999, 2001) found that contingent reward correlated positively and strongly with the transformational behaviors, particularly at lower organizational levels (of which the cadets would be an example). Moreover, these researchers found little differentiation between management by exception and laissez-faire leadership.⁶

Laissez-faire leadership was measured with only one scale, so no computation of total scores was necessary.

Table 32.
Cadets' Overall Transformational Leadership Scores as Rated by Self and Peers

Administration Date	N	Mean	SD	Range of Scores	25 th Percentile	50 th Percentile	75 th Percentile	Skewness	Kurtosis
Self									
Term 3 - Fall '95 ¹	-	-	-	-	-	-	-	-	-
Term 4 - Spr '96	171	4.1	.46	2.7 - 5.0	3.8	4.1	4.4	-.24	-.30
Term 5 - Fall '96	301	4.0	.48	2.7 - 5.0	3.7	4.1	4.4	-.30*	-.41
Term 6 - Spr '97	445	4.0	.50	2.5 - 5.0	3.8	4.0	4.4	-.30*	-.23
Term 7 - Fall '97	186	4.1	.46	2.3 - 5.0	3.8	4.0	4.4	-.32	.51
Term 8 - Spr '98	252	3.8	.49	2.7 - 5.0	3.5	3.9	4.2	-.09	-.55
Peers									
Term 8 - Spr '98	227	3.4	.81	1.0 - 5.0	3.0	3.4	3.9	-.32*	.43

¹Data from Fall 1995 were not available.

* $p < .05$ or $p < .01$; see Appendix B for details.

⁶ Bullis, Kane, and Tremble (1997) found the distinction between laissez-faire leadership and *passive* management by exception to be tenuous. Tisak (1999, 2001) showed that laissez-faire leadership and both *active* and *passive* management by exception formed a "passive" or "bad" leadership factor.

Correlations were computed among cadets' self-ratings on the various leadership behaviors (see Table 33). Results across terms 4 through 8 showed that the higher cadets rated themselves on transformational leadership, the higher they were rated on contingent reward behaviors ($r_s = .57$ to $.70$, $p < .001$) and the lower they were rated on passive management-by-exception ($r_s = -.49$ to $-.37$, $p < .001$) and laissez-faire leadership ($r_s = -.53$ to $-.17$, $p < .001$). Laissez-faire leadership was consistently positively correlated with passive management-by-exception and positively correlated with active management-by-exception (except for in term 6).

Table 33.
Correlation Ranges (Spearman's Rho) Among Self-Ratings on the Distinct Leadership Behaviors for Terms 4 Through 8

	1. Transformational Leadership	2. Contingent Reward	3. Active Mgmt-by-Exception	4. Passive Mgmt-by-Exception
1. Transformational Leadership				
2. Contingent Reward	.57*** to .70***			
3. Active Mgmt-by-Exception	-.23*** to .00	-.19** to .07		
4. Passive Mgmt-by-Exception	-.49*** to -.37***	-.38*** to -.25**	.15 to .38***	
5. Laissez-faire Leadership	-.53*** to -.17***	-.41*** to -.18***	-.01 to .30***	.23*** to .59***

Note. $n = 170 - 447$.

** $p < .01$. *** $p < .001$.

In addition to the three leadership styles that were measured, two outcome measures of leadership style were included in the MLQ. *Extra effort by followers* was measured using a scale with three items (e.g., "I get those I lead to do more than they expected they could do"), and *satisfaction with the leader* was the score on a single item (e.g., "Altogether, I am satisfied with my leadership abilities"). Cronbach's alpha for the *extra effort* scale ranged from .74 to .87 for cadets' self-ratings across Terms 4 through 8 and was .87 for peer ratings during Term 8. As shown by the self-ratings in Table 34, BOLDS cadets believed they were responsible "fairly often" for their associates putting forth extra effort (mean = 3.9), yet they were satisfied with their own leadership abilities only "once in a while" (mean = 2.0).

Table 34.
Self and Peer Ratings of Subordinates' Effort and Satisfaction With Leadership

Administration Date	N	Extra Effort by Those Led ¹	Satisfaction with the Leader
Self			
Term 3 - Fall '95 ²	—	—	—
Term 4 - Spr '96	173	3.99 (0.70)	1.93 (0.92)
Term 5 - Fall '96	303	3.96 (0.68)	1.91 (0.83)
Term 6 - Spr '97	448	3.97 (0.74)	2.03 (0.94)
Term 7 - Fall '97	189	4.02 (0.75)	2.13 (0.92)
Term 8 - Spr '98	255	3.69 (0.70)	2.12 (1.01)
Peers			
Term 8 - Spr '98	231	3.04 (1.07)	2.41 (1.20)

Note. Standard deviations are shown in parentheses.

¹ Cronbach's alpha ranged from .74 to .87 for cadets' self-ratings across Terms 4 through 8 and was .87 for peer ratings.

² Data from Fall 1995 were not available.

ARI's database includes both self and peer ratings from the eighth term. The correlations between these two raters' scores are listed in Table 35. Wilcoxon Signed Ranks Tests were conducted to determine whether differences appeared between cadets' self-ratings and the ratings given by their peers (refer to Tables 31, 32, and 34). Results showed (at a $p < .001$ level) that compared to peer ratings, BOLDS cadets rated themselves lower on laissez-faire leadership and higher on transformational leadership, contingent reward behaviors, and the extra effort elicited from their associates. In contrast, peer ratings during the eighth term were higher than were self-ratings for satisfaction with the individual's leadership abilities ($p < .01$).

Table 35.
Correlations Between Cadets' Self Ratings and Peer Ratings During Term 8

MLQ Scale	N	Spearman's Rho ¹
Transformational leadership	220	.24***
Contingent Reward	223	.16*
Active Mgmt-by-Exception	222	.40***
Passive Mgmt-by-Exception	228	.29***
Laissez-Faire leadership	224	.34***
Extra effort by those led	225	.18**
Satisfaction with leadership abilities	226	.20**

¹ Spearman rank correlation coefficients were calculated rather than Pearson product-moment correlations because some of the scales were skewed.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Leadership Performance

The Leadership Evaluation and Developmental Ratings (LEADR) system at USMA is used to evaluate cadets' military leadership performance and to provide developmental feedback and guidance. In accordance with the LEADR system, cadets receive a military development grade (MD; the evaluative component) for each academic term and summer detail, and they receive Cadet Performance Reports (CPR), which offer developmental information.

Military Development (aka Leadership) Grade

The military development (MD) grade is based on a conventional five-point scale: A(4) – B(3) – C(2) – D(1) – F(0). It is determined by calculating a weighted average of the grades assigned by various raters. For cadets in most duty positions, 50% of their grade is determined by their Tactical Officer, 30% comes from their immediate superior in the cadet chain of command, 10% is determined by their second-level superior, and the final 10% comes from their third-level superior. (An exception occurs when a Tactical Officer gives a grade of D or F, in which case this grade forms 100% of the cadet's final grade.) In keeping with a forced distribution system, no more than 20% of the cadets graded by an individual can receive an A, no more than 40% can receive a B, and no more than 40% can receive a C. The awarding of Ds or Fs is not limited, though these grades rarely occur.

Table 36 displays the distributions of grades that resulted each term and summer. As shown, each term roughly one-third of cadets received Cs, half earned Bs, and less than one-fifth were given As.

Table 36.
Percent of Cadets in Each Grade Range Each Term

Military Development Grades for...	N	D/F ≤ 1.55	C 1.60 – 2.55	B 2.60 – 3.55	A ≥ 3.60
Summer '94	1052	0	44	45	10
Term 1 – Fall '94	1006	<1	38	44	17
Term 2 – Spr '95	980	<1	33	50	17
Summer '95	954	1	42	49	9
Term 3 – Fall '95	946	1	32	51	17
Term 4 – Spr '96	918	<1	33	50	17
Summer '96	885	<1	31	52	17
Term 5 – Fall '96	884	<1	26	53	21
Term 6 – Spr '97	879	1	28	53	19
Term 7 – Fall '97	859	<1	34	57	8
Term 8 – Spr '98 ¹	–	–	–	–	–

¹ Data from Spring 1998 were not available.

Cadet Performance Report (CPR)

The CPR is a rating instrument consisting of 12 leadership dimensions: namely, duty motivation, military bearing, teamwork, influencing others, consideration for others, professional ethics, planning and organizing, delegating, supervising, developing subordinates, decision-making, and oral and written communication. A rated cadet is given a score of 1 ("needs much improvement") to 5 ("excellent") on each dimension. In addition, two dimensions are selected as the cadet's relative strengths and two as his/her relative weaknesses. Lastly, cadets are given an overall ranking that indicates whether their performance is in the upper 10%, upper 25%, middle 30%, lower 25%, or lower 10% of cadets in that particular duty position.

CPRs are primarily completed by cadets, from superior, peer, and subordinate positions. Cadet leaders are required to complete CPRs on those in subordinate duty positions. Peer and subordinate raters, on the other hand, nominate and rate the cadets having the highest and lowest performance relative to others in a particular group (for details, see Schwager & Evans, 1996). Academic instructors are to follow similar procedures, by nominating and rating the highest and lowest performers enrolled in their courses. Hence, it is possible for any cadet to receive multiple peer, subordinate, and instructor CPRs or none at all, depending on whether he/she is considered a high, low, or average performer. Based on the contents of the peer and subordinate CPRs, cadets are to receive developmental counseling from their Tactical Officer. For the BOLDS research, cadets were asked during their third and fourth years to complete CPRs on themselves. The percentage of cadets who received a CPR from each type of rater is recorded in Table 37. While nearly all cadets received a CPR from at least one type of rater each term, relatively few cadets consistently received a CPR from each type of rater.

Table 37.
Cadet Performance Reports (CPRs) Completed Each Term on BOLDS Cadets

	Superior		Peer		Subordinate		Instructor		Self	
	<i>n</i>	%	<i>n</i>	%	<i>N</i>	%	<i>n</i>	%	<i>n</i>	%
Summer '94	955	91	—	—	— ¹	— ¹	—	—	— ²	— ²
Term 1 – Fall '94	948	94	695	69	— ¹	— ¹	502	50	— ²	— ²
Term 2 – Spr '95	953	97	641	65	— ¹	— ¹	503	51	— ²	— ²
Summer '95	941	99	—	—	—	—	—	—	— ²	— ²
Term 3 – Fall '95	901	95	728	77	768	81	515	54	— ²	— ²
Term 4 – Spr '96	854	93	602	66	653	71	563	61	— ²	— ²
Term 5 – Fall '96	694	79	521	59	602	68	470	53	272	31
Term 6 – Spr '97	573	65	345	39	421	48	347	39	425	48
Term 7 – Fall '97	817	95	5	<1	34	4	479	56	186	22
Term 8 – Spr '98	—	—	246	29	—	—	—	—	263	31

¹ During their first year, Plebes do not have subordinates.

² Cadets were not asked to complete CPRs on themselves during their first two years.

Examining the conceptual structure of the CPR instrument, Schwager and Evans (1996) and Tisak (2000) found that rater type (i.e., superior, peer, subordinate, and instructor) has a significant effect on ratings. Nonetheless, of the twelve dimensions, duty motivation and military bearing were found to be most strongly related to the cadet's overall ranking, across rater types. Hence, as a way of strengthening the overall ranking measure while compensating for "missing" CPRs (i.e., not all cadets received CPRs from all types of raters), Tisak (2000) recommended summing each cadet's overall ranking, duty motivation rating, and military bearing rating and computing the mean. This mean, or CPR composite, could then be used as a global measure of cadet leadership performance (see Table 38).

CPR ratings, unlike the military development grades, are not governed by a forced distribution system, so the number of high scorers is unlimited. Moreover, peer and subordinate CPR ratings are largely independent of the MD grade, because they are made by a different set of raters and they are completed after grades are finalized. Nonetheless, MD grades and CPR composites are highly correlated, in part, due to the overlap in chain-of-command raters. Correlations (Spearman's rho) between MD grades and CPR composites for the academic terms ranged from a high of .62 ($p < .001$) in term 3 to a low of .36 ($p < .001$) in term 7. Correlations for the summers of '94 and '95 were even higher ($r_s = .77, p < .001$, and $r_s = .73, p < .001$, respectively) because only superiors completed CPRs.

Table 38.
CPR Composites for BOLDS Cadets Each Term

Term	N	Mean	SD	Range of Scores	25 th Per-centile	50 th Per-centile	75 th Per-centile
Summer '94	1003	3.54	0.67	1.33 – 5.00	3.17	3.50	4.00
Term 1 – Fall '94	995	3.74	0.66	1.50 – 5.00	3.22	3.83	4.33
Term 2 – Spr '95	973	3.89	0.64	2.00 – 5.00	3.33	4.00	4.33
Summer '95	946	3.91	0.57	1.83 – 5.00	3.50	4.00	4.33
Term 3 – Fall '95	939	3.91	0.54	1.83 – 5.00	3.55	4.00	4.33
Term 4 – Spr '96	910	3.96	0.58	2.00 – 5.00	3.56	4.00	4.33
Term 5 – Fall '96	830	3.99	0.59	2.00 – 5.00	3.56	4.08	4.44
Term 6 – Spr '97	780	4.05	0.73	1.50 – 5.00	3.56	4.17	4.67
Term 7 – Fall '97	841	4.07	0.71	1.67 – 5.00	3.67	4.17	4.67
Term 8 – Spr '98 ¹	–	–	–	–	–	–	–

¹ Data from Spring 1998 were not available.

Physical Fitness

To qualify for admission to West Point, candidates must pass the Physical Aptitude Examination (PAE), which consists of five events: pull-ups (men)/flexed-arm hang (women), standing long jump, basketball throw from a kneeling position, 300-yard shuttle run, and a two-minute period of push-ups. USMA publishes a chart that indicates what constitutes a passing score for men and women on each event. Individuals who score below the cut-point on one event may still pass the exam if their score on another event is high enough above the cut-point. Summary descriptive statistics for the 1006 Plebes in the class of '98 are listed in Table 39. The distribution of their scores is positively skewed.

While at USMA, cadets are tested once each term on three events: push-ups, sit-ups, and a two-mile run. These three events are combined into a total Army Physical Fitness Test (APFT) score. As shown in Table 39, BOLDS cadets, as a whole, steadily increased their APFT scores over their USMA careers. Once each term, cadets are also tested on completing the indoor obstacle course; these data are not available to be reported here.

Table 39.
Cadets' Physical Aptitude Exam (PAE) and Army Physical Fitness Test (APFT) Scores

Testing Date	N	Mean	SD	Range of Scores	25 th Per-centile	50 th Per-centile	75 th Per-centile	Skewness	Kurtosis
PAE (pre-entry)	1006	546.2	72.0	419 – 795	489	539	598	.43*	-.36*
APFT									
Term 1 - Fall '94	759	229.1	31.3	100 – 300	209	229	250	-.29*	.36*
Term 2 - Spr '95	917	240.2	24.2	96 – 300	225	240	256	-.44*	1.90*
Term 3 - Fall '95	927	248.8	24.1	142 – 300	233	248	266	-.27*	.24
Term 4 - Spr '96	891	254.2	22.3	164 – 300	239	255	270	-.24*	.01
Term 5 - Fall '96	808	260.5	22.6	174 – 300	245	262	278	-.48*	-.01
Term 6 - Spr '97	802	261.4	22.2	194 – 300	245	264	279	-.32*	-.56*
Term 7 - Fall '97	766	263.6	24.3	178 – 300	247	267	284	.55*	-.31
Term 8 - Spr '98 ¹	–	–	–	–	–	–	–	–	–

¹ Data from Spring 1998 were not available.

* $p < .05$ or $p < .01$; see Appendix B for details.

Cognitive-Emotional Development

At three points in time, a relatively small sample of cadets from the Class of 1998 was interviewed to assess their cognitive-emotional development. More specifically, 38 cadets were interviewed during their first summer; 31 of the original 38 plus an additional 24 cadets (i.e., 55) were interviewed during their second academic year; and 35 cadets from the group of 55 were re-interviewed during their fourth year (see Bartone, Forsythe, Bullis, Lewis, & Snook, 2001).

Underlying the interview technique is Robert Kegan's (1982) constructive-developmental framework that examines the progression of individuals' "meaning-making" – in other words, their understanding of themselves as individuals and of themselves in relation to their surroundings. According to Kegan's stage theory, subject-object relations evolve across the life span, with each successive differentiation of the self (subject) from the world (object) creating a qualitatively more extensive object with which the subject is in relation. The theory suggests six stages (0 to 5), of which the following three were expected to be the most relevant to the cadets:

- *Stage 2 Imperial*: An individual manipulates others to satisfy his/her own needs and interests (primary motivation = "what's good for me").
- *Stage 3 Interpersonal*: An individual perceives himself/herself existing only in relation to others, not as a distinct entity; hence, s/he is motivated by social feedback (primary motivation = "what's mutually good for me and others").
- *Stage 4 Institutional*: An individual perceives the self as autonomous and regulates interpersonal feelings based on "institutional" roles and norms (primary motivation = "what's good for the institution").

The interviews conducted to diagnose developmental stage took place between one cadet and one or two interviewers and lasted about 90 minutes. The interview format had two phases. In the first phase, interviewees were handed a series of cards, each of which had a feeling (e.g., anger) or topic (e.g., success) printed on it. Cadets wrote notes on each card, recalling a recent event associated with the feeling or topic. In the second phase, interviewees talked about the experiences they noted on the cards, and interviewers asked specific open-ended probes in an attempt to reveal the interviewee's perspective and, hence, stage of cognitive-emotional development. Each interview was tape-recorded (with the cadet's permission), transcribed, and scored as to the stage of the interviewee's development by psychologists trained in the Kegan technique (for specifics of the technique, see Lahey, Souvaine, Kegan, Goodman, & Felix, 1988). The resulting data are currently being analyzed by USMA and, therefore, are not available for this report.

Developmental Experiences

The uniqueness of BOLDS lies in its longitudinal nature; no other Army leadership database is available to examine change in individuals over time. Such a perspective is necessary to provide authoritative information on the emergence and development of leadership skills. This longitudinal spectrum originates with data collected on cadets while in high school. Because the experiences a person engages in define and prepare him/her for future experiences, they are seen as key variables in developmental perspectives. Hence, for BOLDS, data were collected on cadets' high school experiences as well as on their developmental experiences at USMA.

Cadets' Experiences Prior to Attending USMA

During the admissions process, USMA officials collected information about prospective cadets from their high schools, faculty members, and the students themselves. From the information gathered, three composite scores were computed to reflect each student's level of participation in athletic activities (AAS) and extracurricular activities (EAS), and to represent the high school faculty's appraisal of a student (FAS). The summary descriptive statistics of these scales for the USMA Class of 1998 are listed in the first three rows of Table 40.

The AAS and EAS scores ranged from 200 to 800 in increments of 100. Half of the BOLDS Plebes received an AAS score of 600 and nearly one-third were given a score of 700. Similarly, 40% of BOLDS Plebes received an EAS score of 600, and another 40% got a score of 400 or 500. The FAS score, in contrast, was a continuous scale running from approximately 500 to 750.

Multiplying each of the above three scores by 0.33 and then summing the results produced a score USMA called the *Leader Potential Score* (i.e., $LPS = 0.33 AAS + 0.33 EAS + 0.33 FAS$). In addition, USMA regularly calculates a *Whole Candidate Score* (WCS), using a student's LPS, College Entrance Examination Rating (CEER; based on SAT or ACT scores), and Physical Aptitude Exam score (PAE). The formula for WCS is as follows: $WCS = 0.60 CEER + 0.30 LPS + 0.10 PAE$. The summary statistics for these two composite scores are noted in the last two rows of Table 40.

Table 40.
Cadets' Candidate Composite Scores for USMA Admissions Purposes

Composite Score	N	Mean	SD	Range of Scores	25 th Percentile	50 th Percentile	75 th Percentile	Skewness	Kurtosis
AAS	1003	606.3	96.6	200 – 800	600	600	700	-1.39*	2.81*
EAS	1003	544.4	113.1	200 – 800	500	600	600	-.24*	-.25
FAS	1003	677.6	37.2	519 – 740	659	684	704	-.98*	1.21*
LPS	1006	609.4	52.1	438 – 745	572	612	644	-.27*	-.05
WCS	1006	6032.6	339.1	5065 – 7009	5818	6058	6249	-.09	-.01

* $p < .05$ or $p < .01$; see Appendix B for details.

Among the numerous extracurricular activities recorded in the Candidate Activities Record (CAR) were participation in band/chorus, drama/debate, student government, school publications, and scouting. The data collected indicate whether an individual was a member or a leader of a particular activity in grade 10, 11, or 12. Overall, one-third of cadets (33%) did not hold any leadership position in these extracurricular activities while in high school. Approximately one-third held one leadership position (32%); 21% held two leadership positions; and 14% held three or more leadership positions in extracurricular activities. These data, however, did not include leadership positions that cadets may have held on athletic teams (e.g., team captain).

In fact, 98% of cadets played a varsity sport in high school, and nearly half of these individuals were team captains (48%). Among the one-third of cadets who did not hold a leadership position in an extracurricular activity, 46% were team captains. In other words, 82% of cadets held a leadership position either in sports or extracurricular activities while in high school.

Prior to attending USMA, 10% of BOLDS cadets had completed military service – in the Army, Air Force, Marines, Navy, Coast Guard, National Guard, or Reserve. As displayed in Table 41, 8% of BOLDS cadets had participated in a high school Junior ROTC program, and 6% had participated in ROTC at the college level. Moreover, 38% of cadets had received a college military scholarship – from the Army, Navy, or Air Force ROTC. The USMA Prep School was attended by 17% of cadets. As noted in Table 41, “retention” rates at USMA differed slightly based on cadets’ prior military experiences.

Table 41.
Cadets’ Prior Military Service/Training

Military Experience	% 1st Term Fall '94 (N ≈ 1004)	% 7th Term Fall '97 (N ≈ 858)	% Retained
Prior military service ¹	10 (101)	10 (82)	81
Participated in H.S. Jr. ROTC program ¹	8 (79)	7 (61)	77
Participated in ROTC college level ¹	6 (64)	7 (61)	95
Received college military scholarship ¹	38 (377)	38 (324)	86
Attended USMA Prep School ²	17 (170)	17 (143)	84
None of the above	45 (451)	45 (385)	85

N shown in parentheses.

¹ Source: Class Characteristics Inventory – Class of 1998.

² Source: USMA Admissions records.

As Table 42 shows, 22% of BOLDS cadets had parents who were on active duty or were retired from the military, and 10% had a parent or sibling who graduated from USMA. Cadets with family members who were USMA graduates were slightly more likely than other cadets to remain through their seventh term (i.e., 90% versus 85%). Among BOLDS cadets, more than one-third also had applied to the US Naval Academy (39%), over one-third also applied to the US Air Force Academy (38%), and about one-fifth applied to the US Coast Guard Academy (19%). Nonetheless, 90% of cadets indicated that USMA was their first choice of schools.

Table 42.
Cadets' Decisions To Attend USMA

Decision-making Influences	% 1 st Term Fall '94	% 7 th Term Fall '97	% Retained
Parent on active duty or retired from military¹	(N = 969)	(N = 829)	
Yes	22 (210)	22 (180)	86
No	78 (759)	78 (649)	86
Parent/sibling is a USMA graduate²	(N = 1003)	(N = 856)	
Yes	10 (95)	10 (85)	90
No	91 (908)	90 (771)	85
% of cadets who applied to:¹	(N = 1004)	(N = 858)	
US Naval Academy	39 (394)	40 (341)	87
US Air Force Academy	38 (379)	39 (331)	87
US Coast Guard Academy	19 (186)	18 (156)	84
US Merchant Marine Academy	13 (125)	12 (105)	84
No US military academy other than USMA	45 (448)	44 (374)	83
Was USMA your . . .³	(N = 967)	(N = 822)	
1 st choice?	90 (865)	90 (741)	86
2 nd choice?	8 (78)	8 (66)	85
≤ 3 rd choice?	2 (24)	2 (15)	63

N shown in parentheses.

¹ Source: Class Characteristics Inventory – Class of 1998.

² Source: USMA Admissions records.

³ Source: Astin 1994 Student Information Form.

Cadets' Experiences While at USMA

The four-year "West Point Experience" is designed to develop cadets in four areas: intellectual, physical, military, and moral-ethical. In addition to a challenging academic program, cadets are required to participate in physical education classes and competitive athletics. They learn basic military skills, including leadership, through a demanding military program, and their moral-ethical development is expected to occur throughout the programs and

experiences available. Two of the most significant experiences for cadets are their military duty positions and their sports participation, as described below. USMA's commitment to cadet development is exemplified by the Center for Enhanced Performance (CEP), discussed at the end of this section.

Duty positions in the U.S. Corps of Cadets

Some of the most important developmental experiences for cadets at USMA are the duty positions they hold in the United States Corps of Cadets. The Corps is organized into four regiments, each of which has two battalions, each of which has four companies (i.e., totaling 32 cadet companies). The Brigade Tactical Department (BTD), led by an active duty Colonel, is responsible for the military command and control of the Corps of Cadets. As such, each regiment is commanded by a Regimental Tactical Officer (RTO), a Lieutenant Colonel, and each company is commanded by a Company Tactical Officer (TAC), a Major or Captain, and a Company Tactical Noncommissioned Officer (TAC NCO), a Master Sergeant or Sergeant First Class. Though managed by the BTD, cadets essentially run the Corps through their own chain of command.

During their first year at USMA, all Fourth Class cadets (Plebes) hold the lowest position in the hierarchy, referred to as "Member of Squad" (MOS). As Third Class cadets, they serve as Team Leaders, responsible for one or two Plebes. Second Class cadets may become cadet noncommissioned officers, such as Squad Leaders, supervising cadets in the lower two classes. During their fourth year, First Class cadets serve as Brigade Commander (First Captain), Regimental Commanders, Battalion Commanders, Company Commanders, Platoon Leaders or in associated staff capacities. Cadets typically hold a different position each term of their third and fourth years (i.e., two different positions per year). Their assignments are determined based on their past performance.

Figure 2 represents the hierarchical structure of the Corps, which may be modified annually depending on class sizes. For purposes of ARI analysis, each duty position was given a value relative to its place in the hierarchy (see the bottom right-hand corner of each box in Figure 2). The lowest position, MOS, was given the lowest value, 0, and the highest position, Brigade Commander, was given the highest value, 8. For each cadet a total score was then computed by summing the values of all of the positions s/he held during the first three and a half years (seven terms) at USMA. Because duty position assignments for the cadets' last term were not available in the ARI database, their values could not be included in this score. In essence, five values were summed, because the two values from the first year are zero.

The scores ranged from 5 to 19, as shown in Table 43. Based on the number of cadets achieving each score, the scores were grouped to represent five percentile groups. In other words, cadets whose duty position values totaled 5 or 6 represent approximately the lowest 10% of the class, in terms of the military rank they held at USMA. Those scoring 7 fall in the lower 25% of cadets (i.e., 11% - 35%), and those with a score of 8 or 9 represent the middle 30% (i.e., 36% - 65%). Cadets with scores of 10 or 11 are in the upper 25% of the class (i.e., 66% - 90%), and the highest 10% scored anywhere from 12 to 19.

West Point

Chain of Command

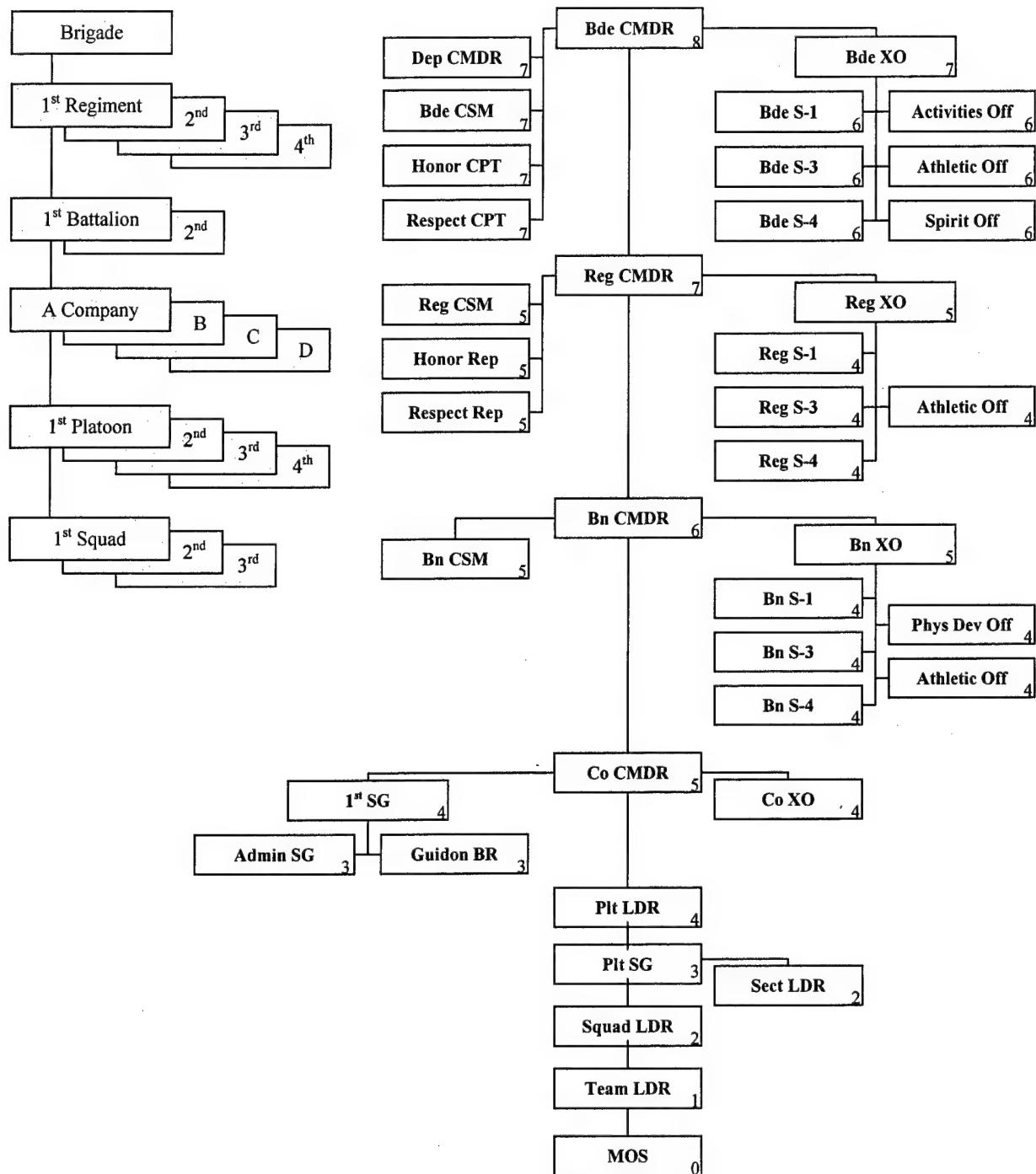


Figure 2. USMA cadet chain of command with relative “rank” indicated for each duty position.

Table 43.
Cadets' Overall Military Rank in Terms of a Percentile Group
As a Function of Duty Positions Held

Percentile Group	Duty Position Score	N	Total N for Group
Lowest 10%	5	1	110
	6	109	
Lower 25%	7	192	192
Middle 30%	8	129	230
	9	101	
Upper 25%	10	102	197
	11	95	
Highest 10%	12	40	101
	13	21	
	14	14	
	15	5	
	16	9	
	17	9	
	18	1	
	19	2	

Such stratification allows the differentiation of cadets who have achieved various levels of leadership experience. For instance, the percentile groups could be characterized using any number of variables available in BOLDS. For an initial glimpse at the cadets in each group, a few personal characteristics mentioned earlier (i.e., gender, ethnicity, and political views) were examined (see Table 44). With respect to gender composition, the higher duty positions had greater percentages of female cadets than did the lower duty positions. The relatively high percentage of "liberals" (16%) among the top 10% of cadets reflects the greater proportion of females in this group ($\chi^2[2, N = 92] = 18.18, p < .001$).

Table 44.
Demographic Characteristics of the Cadets in Each Percentile Group

Characteristic	Duty Position Percentile Group					Total Class
	Lowest 10%	Lower 25%	Middle 30%	Upper 25%	Highest 10%	
Gender						
Male	93	91	89	87	83	89
Female	7	9	11	13	17	11
Ethnicity						
White	80	81	83	87	82	83
Black	5	6	5	3	8	5
Hispanic	6	5	5	4	4	5
Asian	10	5	6	5	4	6
Other	—	3	<1	1	2	1
Political Views						
Conservative	65	50	55	53	55	55
Middle of Road	30	34	35	38	28	34
Liberal	5	15	11	9	16	11

Sports participation

In addition to the Army's fitness requirements, USMA promotes its own philosophy on physical education. According to USMA's website, their athletics program is based on the belief that physically capable officers perform more effectively and on the goal of instilling in cadets a life-long desire to remain physically fit. Toward this goal, cadets are required to participate in competitive sports (either at the intramural, competitive club, or intercollegiate level) and are exposed to a broad sports experience and opportunities for leadership development through sports.

Currently in the ARI database only data regarding cadets' participation in intercollegiate sports are available. As shown in Table 45, during their first five terms at USMA, approximately 39% of males and 50% of females were members of intercollegiate sport teams. These percentages fell during terms 6 and 7 to 20% of males and 31% of females.

BOLDS also includes the breakdown of the specific sports in which cadets were involved (see Table 46). Among men's teams, football, light touch football, lacrosse, track, and soccer were the sports with the highest number of participants. For women, basketball, cross country, soccer, swimming, and volleyball attracted the most participants.

Table 45.
Percentage of Cadets Who Participated in Intercollegiate Sports by Gender

Gender	Term 1 Fall '94 (N = 1006)	Term 2 Spr '95 (N = 980)	Term 3 Fall '95 (N = 946)	Term 4 Spr '96 (N = 918)	Term 5 Fall '96 (N = 884)	Term 6 Spr '97 (N = 879)	Term 7 Fall '97 (N = 859)	Term 8¹ Spr '98
Male	39%	39%	39%	39%	39%	20%	20%	—
Female	48%	49%	50%	50%	51%	30%	32%	—
Total	40%	40%	41%	40%	41%	22%	21%	—

¹ Data from Spring 1998 were not available.

Table 46.
Number of Cadets Who Participated in Each Intercollegiate Sport

Intercollegiate Sport	Term 1-Fall '94 (N=1006)	Term 2-Spr '95 (N=980)	Term 3-Fall '95 (N=946)	Term 4-Spr '96 (N=918)	Term 5-Fall '96 (N=884)	Term 6-Spr '97 (N=879)	Term 7-Fall '97 (N=859)
None	600	585	563	548	524	690	677
Men's Sports							
Football	88	84	82	80	77	34	31
Light-touch fbball	79	77	75	75	73	19	22
Lacrosse	25	25	24	24	24	20	19
Track	25	24	24	24	22	12	11
Soccer	23	22	21	18	18	9	8
Baseball	19	17	17	15	15	9	8
Swimming*	18	18	17	17	17	7	6
Wrestling*	17	17	16	16	16	12	11
Basketball	16	16	15	15	15	4	5
Hockey	12	11	11	10	10	8	8
Cross Country	7	7	7	7	6	3	1
Tennis	6	6	6	6	6	2	2
Gymnastics	6	6	5	4	4	1	1
Golf	3	3	3	3	3	2	1
Rifle Team*	1	1	1	1	1	-	-
Weight Training	-	-	-	-	-	15	15
Fencing*	-	-	-	-	-	-	-
Pistol Team*	-	-	-	-	-	-	-
Squash	-	-	-	-	-	-	-
Women's Sports							
Basketball	11	11	11	9	9	4	3
Cross Country	11	11	10	10	10	3	2
Soccer	9	9	9	8	7	7	7
Swimming*	8	8	8	8	8	5	5
Volleyball	7	7	7	6	5	2	2
Softball	6	6	6	6	6	4	4
Track	6	6	5	5	5	2	5
Tennis	2	2	2	2	2	2	2
Wrestling*	1	1	1	1	1	-	-
Fencing*	-	-	-	-	-	-	-
Gymnastics	-	-	-	-	-	-	-
Pistol Team*	-	-	-	-	-	-	-
Rifle Team*	-	-	-	-	-	-	-

Note. Sports with no participants from the class of 1998 may not have existed as intercollegiate teams during that period.

*Co-ed sport.

The Center for Enhanced Performance (CEP)

The mission of the CEP at USMA is to help cadets overcome challenges and achieve their goals. In keeping with this objective, the CEP offers programs designed to help cadets maximize their academic, athletic, or leadership performance. Cadets may request assistance from the CEP or an instructor or tactical officer may refer them for services.

As noted in Table 47, only a small percentage of cadets made use of any of the CEP's Peak Performance Programs (from 1% to 9%). More than one-quarter of cadets attended the Student Success Course (28% total, 17% of whom were required to take it), and about one-fifth took the Reading Efficiency Course (19%).

Table 47.
Cadets' Use of CEP Programs

CEP Program	% of Cadets (N = 1006)		
Peak Performance Programs:	<u>No Use</u>	<u>Some Use</u>	<u>5+ Sessions</u>
Academic	97	3	<1
Club sports	99	1	<1
Corps squad	91	6	3
Leader development	99	1	<1
Physical training	99	1	<1
Student Success Course	<u>Did Not Take</u>	<u>Required To Take</u>	<u>Volunteered To Take</u>
Student Success Course	72	17	11
Reading Efficiency Course	<u>Did Not Take</u>	<u>Took</u>	
Reading Efficiency Course	81	19	

EXAMINATION OF FACTOR STRUCTURE

The measures described in this report group into 10 general categories theoretically (refer to Table 7). Factor analyses were conducted to examine whether the measures would demonstrate these categories empirically. Because the cognitive-emotional development data from the Kegan interviews were not available, only the measures associated with nine categories were included in the factor analyses. The initial factor analyses used data from term 6 because these data offered the greatest variety of measures and the largest subsample of respondents (refer to Table 6). Only the scores from cadets who received a military development (MD) grade for term 6 were included in these analyses. Specifically, the factor analyses included 28 measures. The sample size of most measures ranged from 430 to 879, although 4 had sample sizes between 300 and 306.

Several of the measures used in the analyses emerged from a solitary event (e.g., the one-time administration of the Nelson-Denny Reading Test or the one semester Psychology Course). Other measures (e.g., leadership style) were administered each term, so these scores are unique to that term. Because the subsample of cadets who participated in the term 6 and term 7 data collections was largely the same, TKML scores (which were collected in term 7) were prevalent enough among term 6 participants ($N = 306$) to be included in the analysis. Similarly, the Hardiness scores were collected during the eighth term from among the entire class of '98. The obtained sample, thus, sufficiently overlapped for inclusion in the factor analysis as well ($N = 430$).

Some of the measures in the BOLDS database (refer to Table 7) were not included in the factor analyses. For instance, the analog ABLE and NEO-PI scales were not included because they are composed of overlapping items (i.e., some survey items appear in the equations of more than one scale) and, hence, the scales are not independent.⁷ The item asking cadets to rate the importance of various reasons to attend USMA was also not included, due to the scoring format of the question. Finally, certain measures could not be included because the data were not available (e.g., Alternate Headlines, Organizational Commitment, Job Satisfaction, Indoor Obstacle Course Test scores, and Kegan's identity interviews).

A series of factor analyses were conducted. Each analysis used principal axis factoring as the extraction method and direct Oblimin rotation, given that correlation among the factors was expected. Correlation matrices were entered for analysis (see Appendix C for the Pearson product-moment correlations among all of the individual variables). For missing values, cases were excluded pairwise, because listwise exclusion would have reduced the analysis sample size to an unacceptable level.

An initial unspecified factor analysis using term 6 measures attempted to extract 10 factors with eigenvalues greater than one and produced a scree plot suggesting a 3-factor solution.

⁷ When the scores from six ABLE analog scales (not the Social Desirability scale) and five NEO-PI analog scales were included in a principal axis factor analysis (with Oblimin rotation) of term 6 data, all of the analog measures except for Openness to experience loaded on one temperament factor.

The resulting three factors could be interpreted as follows (see Table 48 for the pattern matrix):

- (1) *Cognitive Aptitude* – The first factor represents an academically oriented cognitive measure, focused on timed, closed-ended, pencil-and-paper tests.
- (2) *Good Leadership* – The second factor suggests a measure of good leadership, based on openness to new experiences, ideas, and perspectives. It includes transformational leadership, contingent reward, and hardiness, which loaded positively on the factor, and passive leadership, which loaded negatively.
- (3) *Achievement* – The third factor appears to measure general personal achievement, and includes measures of leadership performance, class grades, and the physical fitness test score.

The magnitude of the correlations among the three factors ranged from .10 to .21 (see Table 49). Factors 2 and 3 were the most highly correlated ($r = .21$), followed by factors 1 and 2 ($r = .15$). Given the low correlation among the factors, analyses were repeated using orthogonal Varimax rotation, and results were essentially the same. (Refer to Appendix C for the Pearson correlations between the individual variables.)

Measures that did not load on a factor above .30 included the measures of complex problem-solving skills, tacit knowledge of military leadership, and the motivation measures.

To determine whether a similar three-factor solution would emerge using data from a different term, principal axis factor analyses with Oblimin rotations were completed using the data from term 5 and term 7. Each analysis included only the cadets who received a military development grade for the respective term. In both cases, a cognitive aptitude factor, good leadership factor, and achievement factor emerged, with slight variation. For instance, in term 7 the psychology class grade loaded higher on the cognitive factor than on the achievement factor, and the tacit knowledge measure loaded on the leadership factor. Even though the factor structures resulting from term 5 and term 7 data were similar to that emerging from term 6, the term 5 data failed Bartlett's test of sphericity, suggesting there were not sufficient relationships among the variables to warrant factor analysis.

Table 48.
Pattern Matrix for the Three-Factor Solution of Term 6 Data

Measure	Cognitive Aptitude	Good Leadership	Achievement
Cognitive Skills & Abilities			
CEER	.614		.267
Psychology Course grade	.321	-.199	.522
Military Leadership Course grade			.594
Nelson-Denny Vocabulary score	.662		.145
Nelson-Denny Reading Comprehension score	.677	-.113	.154
Nelson-Denny Reading rate	.443		
Logic Test score	.500		
Mental Rotations Test score	.325		
Obvious responses to Consequences Test			
Remote responses to Consequences Test	.289	.295	
Complex Problem-Solving Skills			
Military Scenarios score – Summer 1994 (original scoring)	.251	.126	
Military Scenarios score – Term 6 (revised scoring)	.177	.154	
Organizational Scenarios score	.156	.130	.172
Tacit Knowledge of Military Leadership	.299	.183	.109
Temperament			
Hardiness		.494	
Motivation			
Implicit Theory of leadership score ¹	.149		
Army career intent ²	-.137		
Leadership Style			
Transformational Leadership total score	-.105	.798	
Contingent Reward score	-.113	.750	
Active Mgmt-by-Exception score			
Passive Mgmt-by-Exception score		-.612	
Laissez-faire Leadership score		-.277	
Leadership Performance			
Military Development grade		.127	.543
Cadet Performance Report	-.120		.623
Physical Fitness			
PAE score	-.283		.122
APFT score from term 6	-.269		.490
Developmental Experiences			
Athletic activities score (high school)	-.336		
Extracurricular activities score (high school)			.101

Note. Loadings greater than .1 are listed in the table. Boldface type indicates the variable's highest loading.

¹ Higher values indicate the individual believes leadership ability is more developable than innate.

² Higher values indicate the individual intends to leave the Army sooner.

Table 49.
Factor Correlation Matrix for the Three-Factor Solution of Term 6 Data

Factor	1 Cognitive Aptitude	2 Good Leadership	3 Achieve- ment
1 Cognitive Aptitude			
2 Good Leadership	.15		
3 Achievement	.10	.21	

DISCUSSION

As part of the Baseline Officer Longitudinal Data Set (BOLDS), numerous measures were collected on cadets in the Class of '98 throughout their four years at USMA. This report documents the measures available in BOLDS and provides an overview of the descriptive statistics for the variables in the ARI database.

Based on theory and previous research, the measures were classified into nine broad categories: cognitive abilities, complex problem-solving skills, tacit knowledge of military leadership, temperament, motivation, leadership style, leadership performance, physical fitness, cognitive-emotional development, and developmental experiences. While variables in some categories showed good psychometric properties (e.g., SAT/ACT), others showed signs of skew or unreliability (e.g., Organizational Scenarios). A summary of the results in each of these categories and a discussion of the implications for future research tasks follow.

Categories of Measures

Cognitive abilities

While the standardized tests have established levels of internal consistency (e.g., SAT, ACT, Nelson-Denny Reading Test), reliabilities for some of the measures could not be determined based on the data available at ARI (e.g., Logic Test, Mental Rotations Test). Researchers interested in using the Logic Test or the MRT may want to obtain item-level data from USMA to establish reliabilities. In addition, two cognitively based variables that are available to USMA, but currently not to ARI, include cadets' cumulative GPA and final class rank. Researchers measuring cognitive performance might consider obtaining these variables for their analyses. Lastly, the Alternate Headlines Test (a measure of writing ability and creativity) has not yet been scored, and Dela Rosa et al. (1997) recommended an improved scoring protocol. This task could also be undertaken in the future.

Complex problem-solving skills

When using the original scoring schemes for the Military Scenarios and Organizational Scenarios (i.e., seven or eight 5-point rating scales), reliabilities were somewhat low, averaging .47 for Military Scenarios and .58 for Organizational Scenarios. Applying the revised scoring scheme for Military Scenarios, however, improved reliability, resulting in a mean correlation of .64.

Dela Rosa et al. (1997) explained that the Military Scenarios instrument was intended to measure "problem construction," something more complex than what its three questions ask respondents to demonstrate. They suggested that respondents who elaborate on scenario information (rather than simply regurgitate it) might be showing initiative, which they found correlated with such external variables as leader achievement and rank. Nonetheless, for a more precise measure of problem construction, a future version of the instrument might include questions that prompt respondents to consider factors beyond the information provided.

Tacit knowledge of military leadership

Unlike the other scenario-based instruments, the TKML-Platoon Leader Questionnaire did not require cadets to write their own responses. Instead, they rated various predetermined problem solutions, and their ratings were compared with those of more experienced officers. Future data collection on the Class of '98 should include the TKML-PLQ, to gauge improvement on this measure after having been a platoon leader, or the TKML-Company Commander Questionnaire, to anticipate readiness for company command. Currently, TKML tools are being developed with text analysis capabilities in a Web environment. Such a format, requiring respondents to construct their own solutions might be doubly informative – providing insight into officers' tacit knowledge, interpersonal skills, and problem construction abilities.

Temperament

Most of the ABLE and NEO-PI analog scales that were developed to measure temperament resulted in skewed distributions of scores. As an initial step toward understanding what role these analog measures might play in future BOLDS analyses, Milan (in press) used the analog scale scores to replicate analyses that had been done previously using the actual ABLE and NEO-PI scores. Results were consistent with previous findings, suggesting these analog scales may suffice as temperament measures in future BOLDS analyses. Nonetheless, given the empirical nature of the scales' development, further examination seems warranted, particularly the construct validation of the scales. One direct temperament measure was included in BOLDS: that is, hardiness, which Bartone (1999a) has shown to be linked to performance. Administration of other direct measures of temperament should be considered in future data collections on the BOLDS cohort.

Motivation

The motivation-related measures varied from understanding cadets' reasons for seeking admission to USMA, to their feelings once in attendance, to their future career plans. Interestingly, while three-quarters of cadets indicated that self-development and leadership training were important reasons for attending USMA, a similar proportion endorsed, to some degree, the belief that leadership ability is more of an innate characteristic than a developable skill. Hence, the first hurdle in leader development may be to make cadets aware of the value of training and experience for enhancing their leadership effectiveness. Three other measures pertaining to organizational commitment and job satisfaction were administered to cadets (Meyer and Allen's Affective Commitment Scale, Penley and Gould's Calculative Commitment Scale, and items modified from the Minnesota Satisfaction Questionnaire), but they have not yet been scored. Future data collections could include the four-item affective and continuance commitment scales developed by ARI (as shortened versions of Meyer and Allen's, 1997, scales), to track the changes in officers' commitment to the Army over time (Gade, 2000).

Leadership style

Overall, the MLQ measures of leadership styles and leadership outcomes showed reasonable means and distributions. For practically all of the scales, Cronbach's alpha was

higher for peer ratings than for self-ratings, and the correlations between self and peer ratings were relatively low. In general, cadets believed they engaged in transformational leader behaviors “fairly often” and laissez-faire behaviors “once in a while.” The behaviors representing transactional leadership were displayed at varying frequencies. That is, whereas cadets felt they used *contingent reward* “fairly often,” they thought they engaged in *active management-by-exception* “sometimes” and *passive management-by-exception* “once in a while.” Moreover, they felt they were responsible “fairly often” for their subordinates’ expending extra effort, yet they were satisfied with their own leader abilities only “once in a while.” In contrast, peer ratings of satisfaction with the leader’s abilities were higher than self-ratings. This suggests either an element of modesty in rating satisfaction with one’s own ability, insecurity in one’s leader performance, the internalization of negative feedback, or the desire for self-improvement. Further analysis of the 360-degree perception of these styles can occur once all of the ratings from supervisors, subordinates, and peers become available.

Leadership performance

The evaluation of cadets’ military leadership performance each semester resulted in a military development grade, which was based on a forced distribution system. As an overall measure of cadets’ performance relative to their classmates, the MD grade is an informative measure. However, the Cadet Performance Report (CPR) may be even more instructive because it not only provides an overall rating, but also differentiates 12 specific dimensions of leadership (e.g., supervising, delegating, decision-making, teamwork, influencing others). Moreover, CPRs were completed by cadets in superior, peer, and subordinate positions, so the potential exists for 360-degree feedback on cadets’ performance. Examination of particular leadership dimensions in light of future performance data may be insightful, though analyses must take into account the fact that CPRs were more often completed on low and high performers than on those considered average. Cadets’ MD grades for their final semester at West Point, though missing from the ARI database, can be obtained from USMA.

Physical fitness

Measures of cadets’ physical fitness are routinely collected by USMA each term, and while the APFT scores were incorporated into ARI’s database, the IOCT scores are not yet available. The fact that cadets’ APFT scores show a steady increase across the four years suggests that USMA’s athletics program is succeeding – perhaps by both weeding out cadets who are low in physical aptitude and improving the fitness levels of the cadets who remain. Because physical fitness and/or exercise have been found to be associated with leader effectiveness among VMI cadets (Atwater et al., 1999) and, in general, with mental performance (Gruber, 1975) and psychological well-being (Plante & Rodin, 1990), APFT scores should continue to be merged into BOLDS during future data collections.

Cognitive-emotional development

Though labor-intensive, collection of interview data based on Robert Kegan’s “constructive-developmental” framework holds promise for providing insight into how an individual’s stage of cognitive-emotional development influences his/her leader performance and

readiness for leader development. USMA's analysis of the extant interview data is expected to inform the selection of variables in future data collections. Moreover, follow-up interviews are scheduled to be conducted on the same cohort to measure the individuals' most recent developmental stage and assess their personal growth.

Developmental experiences

The longitudinal perspective underlying BOLDS values experiences as integral to individuals' development. Hence, cadets' experiences, beginning in high school and occurring throughout their USMA career, are included in BOLDS. Based on cadets' high school records, USMA admissions officials computed three scores reflecting cadets' athletic activity, participation in extracurricular activities, and faculty appraisals, in addition to an overall Leader Potential Score. Because there are very few low-scoring students admitted to USMA, the distribution of these scores show signs of negative skew. Aside from high school, some cadets experienced military service or training prior to entering USMA. Interestingly, cadets who participated in college ROTC had a higher graduation rate at USMA than did cadets who attended USMA's Prep School, received a college military scholarship, participated in high school junior ROTC, or served in the military.

While at USMA one important developmental experience cadets encounter is the holding of duty positions in the U.S. Corps of Cadets. These military assignments provide cadets with invaluable real-life leadership experiences. Other significant experiences at USMA include cadets' sports participation and club membership. At the intercollegiate level, an average of 39% of male cadets and 50% of female cadets participated on athletic teams during their first five terms at USMA. Data pertaining to involvement in extracurricular activities and other levels of sports (e.g., intramural), though not available in the ARI database, can be culled from USMA archives.

Because individuals from the Class of '98 will continue to grow from the experiences they have as Army officers, future research intends to document the key developmental experiences that occur throughout their careers. For instance, data related to their assignments, performance, promotions, and awards may be extracted from Army archival records, such as the Officer Master File (OMF), and merged with BOLDS. Identifying such experiences may ultimately inform the leader development process by suggesting effective career "trajectories" that prescribe what types of assignments and educational experiences are critical at what points in an officer's development.

Factor Structure

Factor analysis results suggest the variables in BOLDS can be categorized into three broad domains of cadet characteristics: cognitive aptitude, leadership potential, and personal achievement. The cognitive dimension is more strongly represented by closed-ended pencil-and-paper tests (e.g., Nelson-Denny tests, Logic Test) than by open-ended constructed response tasks (e.g., Military Scenarios, Consequences Test). This suggests complex problem-solving skills may contribute uniquely to leader effectiveness, a theory in line with the foundation of BOLDS.

The leadership dimension captures cadets' self-reported leadership style and temperament, reflecting their openness to new ideas and experiences and their active involvement in confronting challenges. Lastly, the achievement domain represents the hard work and accomplishments realized by cadets. This factor is particularly interesting because it suggests there is a common achievement construct underlying academics, athletics, and military performance.

Recommendations for Future Research

In addition to enumerating the range of measures gathered as part of BOLDS, this report has also indicated where gaps exist in the current database. In some cases, the data already exist but need to be scored or compiled in the database. In other cases, the variables would need to be measured in future data collections. One way of regularly collecting data in the future would be to include the officers from USMA's class of 1998 as recipients of the Survey on Officer Careers, which the Army Personnel Survey Office (APSO) administers every two years. The BOLDS officers could compose a special sample so as not to disrupt the random sampling procedures followed by APSO.

Another complement to BOLDS would be a parallel database focused on officers commissioned through sources other than USMA. ROTC and OCS cohorts from the same Year Group (1998) could be included in future data collections. Specifically, for the next research phase, data on all of these officers could be gathered while they attend a Captains Career Course. For the ROTC and OCS officers, data from earlier in their careers could then be culled from Army archives (e.g., OMF). By broadening the sample in this way, research findings would be more representative of the Army's officer corps as a whole.

Given the extent of the BOLDS database and its longitudinal nature, innumerable analyses could be performed using these measures. One pursuit with immediate impact would be using the BOLDS data to replicate the statistical analyses performed by Atwater et al. (1996) with VMI data. For each of two measures of leader effectiveness (military rank attained senior year and peer rankings obtained senior year), they grouped cadets into three categories (high, middle, low). Using these three groups, they plotted measures of cadets' attributes over their four years at VMI and found that individual differences and leadership behaviors measured in earlier years predicted subsequent leader effectiveness. Subjecting BOLDS data to a similar approach would enable a comparison between cadets at these two military institutes. Another course worth pursuing might be analyses that extend the MRI research (used as a foundation for BOLDS) by incorporating the TKML measure to understand how tacit knowledge relates to both complex problem solving and leader performance.

Of particular interest to the Army's program of leader development may be analyses that use the measures described in this report to identify "cadet types" and "training" experiences that "predict" leadership performance while at USMA and later during one's military career. As the Army researches how to accelerate the development of leader skills and how best to equip Objective Force officers to be adaptive and self-aware, the longitudinal perspective of BOLDS will provide unique insight into how individuals develop as leaders.

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APPENDIX A: LIST OF ACRONYMS

AAS – (High School) Athletic Activities Score
ABLE – Assessment of Background and Life Experiences
ACT - American College Test
APFT – Army Physical Fitness Test
APSO – Army Personnel Survey Office
ARI – U.S. Army Research Institute for the Behavioral and Social Sciences
BOLDS – Baseline Officer Longitudinal Data Set
BS&L – USMA's Department of Behavioral Sciences and Leadership
BTD – Brigade Tactical Department
CAR – USMA Candidate Activities Record
CBT – Cadet Basic Training (“Beast Barracks”)
CCI – Class Characteristics Inventory
CEER – College Entrance Examination Rating
CEP – Center for Enhanced Performance
CIDB – Cadet Information DataBase
CPR – Cadet Performance Report
EAS – (High School) Extracurricular Activities Score
FAS – (High School) Faculty Appraisal Score
GPA – Grade point average
IOCT – Indoor Obstacle Course Test
IRAB – Institutional Research and Analysis Branch, Office of Policy, Planning, and Analysis
LDB – Leader Development Branch
LDRC – Leader Development Research Center
LEADR – Leadership Evaluation and Developmental Ratings
LPS – Leader Potential Score
MD – Military Development (leadership) grade
MLQ – Multifactor Leadership Questionnaire
MRT – Mental Rotations Test
NEO-PI – NEO Personality Inventory
OCS – Officer Candidate School
OMF – Officer Master File
PAE – Physical Aptitude Examination
ROTC – Reserve Officer Training Corps
RTO – Regimental Tactical Officer
SAT – Scholastic Aptitude Test
SBIR – Small Business Innovation Research program
SIF – Student Information Form
TAC – Tactical Officer
TAC-NCO – Tactical Noncommissioned Officer
TKML-PLQ – Tacit Knowledge for Military Leaders – Platoon Leader Questionnaire
USMA – United States Military Academy
VMI – Virginia Military Institute
WCS – Whole Candidate Score

APPENDIX B: SKEWNESS AND KURTOSIS OF BOLDS MEASURES

Measure	Std. Error			Std. Error		
	Skewness	of Skew	Signif.	Kurtosis	of Kurtosis	Signif.
SAT - total	0.01	0.081	0.12	-0.13	0.162	-0.83
SAT - math	-0.18	0.081	-2.21 *	-0.18	0.162	-1.10
SAT - verbal	0.24	0.081	3.00 **	-0.20	0.162	-1.23
ACT - total	-0.35	0.093	-3.75 **	-0.13	0.186	-0.72
ACT - English	-0.29	0.093	-3.08 **	0.32	0.186	1.72
ACT - math	-0.13	0.093	-1.39	0.29	0.186	1.56
ACT - reading	-0.15	0.093	-1.57	-0.15	0.186	-0.78
ACT - science reasoning	-0.38	0.093	-4.03 **	-0.48	0.186	-2.56 *
CEER	0.03	0.077	0.44	-0.13	0.154	-0.82
Nelson-Denny vocabulary	0.38	0.077	4.96 **	0.04	0.155	0.24
Nelson-Denny comprehension	-0.60	0.077	-7.84 **	0.21	0.154	1.35
Nelson-Denny reading rate	1.32	0.077	17.19 **	2.45	0.155	15.78 **
Psychology class grade	-0.01	0.078	-0.10	-0.53	0.155	-3.40 **
Leadership class grade	-0.36	0.083	-4.33 **	0.38	0.166	2.31 *
Logic test	-0.56	0.078	-7.21 **	0.85	0.155	5.51 **
MRT test	-0.05	0.078	-0.60	-0.67	0.155	-4.34 **
Consequences test						
Obvious responses - Term 4	0.52	0.195	2.65 **	0.40	0.387	1.04
Obvious responses - Term 5	0.81	0.138	5.86 **	0.95	0.274	3.46 **
Obvious responses - Term 6	0.80	0.139	5.72 **	1.19	0.278	4.27 **
Obvious responses - Term 8	0.87	0.152	5.72 **	0.99	0.303	3.26 **
Remote responses - Term 4	0.41	0.195	2.08 *	0.37	0.387	0.94
Remote responses - Term 5	0.86	0.138	6.26 **	1.39	0.274	5.09 **
Remote responses - Term 6	0.89	0.139	6.42 **	1.44	0.278	5.17 **
Remote responses - Term 8	0.99	0.152	6.51 **	1.74	0.303	5.73 **
Duplicate responses - Term 4	2.32	0.195	11.89 **	7.98	0.387	20.63 **
Duplicate responses - Term 5	2.52	0.138	18.27 **	7.92	0.274	28.89 **
Duplicate responses - Term 6	2.16	0.139	15.55 **	6.53	0.278	23.49 **
Duplicate responses - Term 8	3.75	0.152	24.70 **	22.74	0.303	75.04 **
Irrelevant responses - Term 4	5.92	0.195	30.35 **	48.23	0.387	124.63 **
Irrelevant responses - Term 5	2.96	0.138	21.47 **	13.12	0.274	47.89 **
Irrelevant responses - Term 6	6.35	0.139	45.68 **	59.31	0.278	213.36 **
Irrelevant responses - Term 8	3.14	0.152	20.66 **	11.64	0.303	38.41 **
Military scenarios - Summer 94	0.78	0.078	9.94 **	1.04	0.155	6.72 **
Military scenarios - Term 4	0.11	0.222	0.51	-0.12	0.440	-0.27
Military scenarios - Term 5	-0.08	0.133	-0.62	-0.06	0.265	-0.24
Military scenarios - Term 6	-0.09	0.141	-0.66	0.10	0.281	0.35
Military scenarios - Term 8	-0.05	0.155	-0.32	0.05	0.309	0.17
Organizational scenarios	0.35	0.078	4.42 **	0.51	0.155	3.30 **
TKML	-1.83	0.139	-13.14 **	3.31	0.277	11.95 **

Table continues on next page

Measure	Skewness	Std. Error of Skew	Signif.	Kurtosis	Std. Error of Kurtosis	Signif.
ABLE analog scales						
Total	-0.41	0.093	-4.35 **	0.34	0.185	1.81
Dominance	-0.32	0.087	-3.63 **	-0.05	0.175	-0.30
Energy Level	-0.49	0.090	-5.41 **	0.61	0.180	3.37 **
Emotional Stability	-0.30	0.093	-3.23 **	0.45	0.185	2.44 *
Social Desirability	-0.17	0.092	-1.89	0.09	0.183	0.46
Traditional Values	-0.77	0.097	-7.96 **	0.78	0.193	4.02 **
Work Orientation	-0.38	0.085	-4.41 **	0.29	0.171	1.70
NEO-PI analog scales						
Agreeableness	0.06	0.086	0.72	-0.19	0.173	-1.09
Conscientiousness	-0.47	0.093	-5.02 **	0.35	0.186	1.88
Extraversion	-0.24	0.089	-2.73 **	-0.15	0.178	-0.83
Neuroticism	0.38	0.087	4.40 **	0.10	0.175	0.59
Openness	0.60	0.087	6.84 **	0.79	0.175	4.49 **
Hardiness	-0.22	0.118	-1.84	0.27	0.235	1.13
Implicit theory - Term 4	0.37	0.184	2.03 *	-0.33	0.366	-0.90
Implicit theory - Term 5	0.34	0.142	2.42 *	-0.17	0.282	-0.59
Implicit theory - Term 6	0.51	0.116	4.40 **	-0.08	0.232	-0.33
Implicit theory - Term 7	0.35	0.177	1.98 *	-0.21	0.353	-0.61
Transformational ldrship - Term 4	-0.24	0.186	-1.27	-0.30	0.369	-0.82
Transformational ldrship - Term 5	-0.30	0.140	-2.14 *	-0.41	0.280	-1.46
Transformational ldrship - Term 6	-0.30	0.116	-2.59 **	-0.23	0.231	-0.97
Transformational ldrship - Term 7	-0.32	0.178	-1.80	0.51	0.355	1.45
Transformational ldrship - Term 8	-0.09	0.153	-0.61	-0.55	0.306	-1.80
Transform. (peer rating) Term 8	-0.32	0.162	-1.98 *	0.43	0.322	1.34
Transactional ldrship scales						
Contingent reward - Term 4	-0.62	0.185	-3.32 **	-0.07	0.368	-0.19
Contingent reward - Term 5	-0.45	0.140	-3.23 **	-0.16	0.279	-0.57
Contingent reward - Term 6	-0.55	0.115	-4.81 **	0.46	0.230	1.99 *
Contingent reward - Term 7	-0.66	0.177	-3.72 **	0.33	0.352	0.92
Contingent reward - Term 8	-0.28	0.153	-1.86	0.03	0.304	0.10
Cont. Rew. (peer rating) - 8	0.29	0.161	1.81	0.01	0.320	0.02
Mng by excpt-act - Term 4	-0.19	0.185	-1.02	-0.45	0.367	-1.24
Mng by excpt-act - Term 5	-0.18	0.140	-1.28	-0.34	0.280	-1.23
Mng by excpt-act - Term 6	-0.02	0.115	-0.19	-0.22	0.230	-0.97
Mng by excpt-act - Term 7	-0.15	0.177	-0.86	-0.34	0.352	-0.96
Mng by excpt-act - Term 8	-0.09	-0.153	0.57	0.32	0.304	1.06
MBE-act (peer rating) - 8	-0.20	0.161	-1.23	-0.24	0.321	-0.74
Mng by excpt-pass - Term 4	0.65	0.184	3.54 **	0.25	0.366	0.69
Mng by excpt-pass - Term 5	0.43	0.140	3.10 **	0.25	0.280	0.88
Mng by excpt-pass - Term 6	0.39	0.115	3.35 **	-0.03	0.230	-0.11
Mng by excpt-pass - Term 7	0.43	0.177	2.45 *	-0.35	0.353	-0.98
Mng by excpt-pass - Term 8	0.10	0.151	0.63	-0.16	0.302	-0.53

Table continues on next page

Measure	Std. Error			Std. Error		
	Skewness	of Skew	Signif.	Kurtosis	of Kurtosis	Signif.
MBE-pass (peer rating) - 8	-0.03	0.159	-0.17	-0.37	0.318	-1.15
Laissez-Faire Idrship - Term 4	1.36	0.185	7.34 **	2.30	0.367	6.28 **
Laissez-Faire Idrship - Term 5	0.84	0.140	5.97 **	0.61	0.279	2.20 *
Laissez-Faire Idrship - Term 6	-0.26	0.116	-2.25 *	-0.87	0.231	-3.78 **
Laissez-Faire Idrship - Term 7	1.17	0.177	6.59 **	1.43	0.353	4.05 **
Laissez-Faire Idrship - Term 8	0.56	0.152	3.66 **	-0.21	0.303	-0.70
Laissez-Faire (peer rating) Term 8	0.27	0.161	1.70	-0.64	0.320	-2.00 *
Extra effort - Term 4	-0.29	0.185	-1.55	-0.45	0.367	-1.23
Extra effort - Term 5	-0.14	0.140	-1.01	-0.58	0.279	-2.08 *
Extra effort - Term 6	-0.35	0.115	-3.03 **	-0.27	0.230	-1.16
Extra effort - Term 7	-0.56	0.177	-3.16 **	0.63	0.352	1.79
Extra effort - Term 8	-0.15	0.153	-0.96	0.29	0.304	0.96
Extra effort (peer rating) Term 8	-0.10	0.160	-0.64	-0.62	0.319	-1.94
Satisfaction w/ Idr ability - Term 4	1.01	0.184	5.48 **	1.00	0.366	2.72 **
Satisfaction w/ Idr ability - Term 5	0.77	0.140	5.51 **	0.73	0.279	2.63 **
Satisfaction w/ Idr ability - Term 6	0.93	0.115	8.06 **	1.00	0.230	4.34 **
Satisfaction w/ Idr ability - Term 7	0.74	0.177	4.18 **	0.43	0.352	1.21
Satisfaction w/ Idr ability - Term 8	0.72	0.152	4.71 **	0.01	0.303	0.03
Satis. w/ Idr (peer rating) Term 8	0.61	0.160	3.82 **	-0.39	0.318	-1.23
Military dev. grade - Sum '94	0.41	0.077	5.34 **	-0.74	0.154	-4.81 **
Military dev. grade - Term 1	0.26	0.077	3.32 **	-0.94	0.154	-6.10 **
Military dev. grade - Term 2	0.15	0.078	1.94	-0.70	0.156	-4.51 **
Military dev. grade - Sum '95	-0.12	0.079	-1.54	1.16	0.158	7.32 **
Military dev. grade - Term 3	0.09	0.080	1.15	-0.54	0.159	-3.40 **
Military dev. grade - Term 4	0.19	0.081	2.36 *	-0.95	0.161	-5.92 **
Military dev. grade - Sum '96	0.08	0.082	0.95	-0.67	0.164	-4.10 **
Military dev. grade - Term 5	0.12	0.082	1.41	-0.95	0.164	-5.78 **
Military dev. grade - Term 6	-0.01	0.082	-0.07	-0.77	0.165	-4.65 **
Military dev. grade - Term 7	0.16	0.083	1.94	-0.83	0.167	-4.98 **
CPR mean - Summer '94	-0.17	0.078	-2.18 *	-0.22	0.156	-1.43
CPR mean - Term 1	-0.26	0.078	-3.38 **	-0.63	0.155	-4.08 **
CPR mean - Term 2	-0.31	0.078	-3.96 **	-0.62	0.157	-3.92 **
CPR mean - Summer '95	-0.29	0.080	-3.65 **	-0.19	0.159	-1.20
CPR mean - Term 4	-0.41	0.081	-5.11 **	-0.30	0.162	-1.85
CPR mean - Term 5	-0.46	0.085	-5.42 **	-0.38	0.170	-2.21 *
CPR mean - Term 6	-0.68	0.088	-7.72 **	-0.08	0.175	-0.43
CPR mean - Term 7	-0.66	0.084	-7.86 **	-0.09	0.168	-0.52
PAE	0.43	0.077	5.60 **	-0.36	0.154	-2.32 *
APFT - Term 1	-0.29	0.089	-3.28 **	0.36	0.177	2.02 *
APFT - Term 2	-0.44	0.081	-5.37 **	1.90	0.161	11.82 **
APFT - Term 3	-0.27	0.080	-3.35 **	0.24	0.160	1.51
APFT - Term 4	-0.24	0.082	-2.93 **	0.01	0.164	0.06
APFT - Term 5	-0.48	0.086	-5.59 **	-0.01	0.172	-0.04

Table continues on next page

Measure	Std. Error			Std. Error		
	Skewness	of Skew	Signif.	Kurtosis	of Kurtosis	Signif.
APFT - Term 6	-0.32	0.086	-3.72 **	-0.56	0.172	-3.24 **
APFT - Term 7	-0.55	0.088	-6.19 **	-0.31	0.176	-1.74
AAS	-1.39	0.077	-18.05 **	2.81	0.154	18.25 **
EAS	-0.24	0.077	-3.10 **	-0.25	0.154	-1.65
FAS	-0.98	0.077	-12.69 **	1.21	0.154	7.86 **
LPS	-0.27	0.077	-3.47 **	-0.05	0.154	-0.30
WCS	-0.09	0.077	-1.17	-0.01	0.154	-0.09

* $p < .05$. ** $p < .01$.

APPENDIX C: CORRELATIONS OF BOLDS MEASURES

Correlations of BOLDS Measures (those in parentheses were not entered in the factor analyses)

	CEER	Psych cls	Ldrship cls	Vocab	Comprhsn	Readrate	Logic	MRT	Obv.	Remote	Probsolv
CEER											
Psych class	.49**										
Ldrship class	.27**	.43**									
Vocabulary	.45**	.32**	.12**								
Comprhsn	.44**	.32**	.14**	.56**							
Reading rate	.24**	.11**		.43**	.35**						
Logic test	.33**	.16**	.10**	.32**	.38**	.23**					
MRT	.19**			.17**	.23**	.10**	.26**				
Obvious resp-6	-.13*		.15**					.13*			
Remote resp-6	.13*			.23**	.19**	.23**	.18**		.16**		
Prob. Solving	.15**	.11**		.16**	.17**	.12**	.11**			.24**	
Mil. Scenario-6	.12*				.15**					.12*	.16**
Soc. Judgmnt	.14**	.12**	.10**	.13**	.12**	.09**	.08*			.26**	.35**
TKML	.23**	.14*		.24**	.22**		.23**				.17**
(ABLE Total*)						.10*					.12**
(Dominance*)					-.09*	.09**			-.07*		.14**
(Energy*)	.10**	.08*				.14**				-.10*	.15**
(Emotional Stab.*)						.09*					.08*
(Soc. Desir.*)											
(Trad. Values*)	.09*										
(Work orient.*)	.08*	.09*	.08*	-.09*	-.15**		-.15**	-.12**			.10**
(Agreeable^)	.07*										
(Conscientious^)	.10*					.09*					.10**
(Extraversion^)	-.10**			-.09*	-.13**			-.11**	.15*		.13**
(Neuroticism^)	-.12**	-.10**		-.14**		-.15**					-.09*
(Openness^)						.13**					.13**
Hardiness									.15*	.19*	
Theory-6	.13**										-.08*
Intent											
Transformational						.12**				.20**	
Cont. Reward						.10*				.21**	
Mng by Excpt - A											
Mng by Excpt - P										-.21**	-.11*
Laissez-faire											
MD Grade - 6	.10**	.18**	.29**								
CPR Mean - 6	.10**	.18**	.32**								
PAE	-.21**			-.14**	-.16**		-.15**	-.14**			
APFT - 6		.20**	.24**				-.10**	-.12**			
AAS	-.25**	-.10**		-.15**	-.19**	-.09**	-.07*	-.09**			
EAS	.13**										.08*
(FAS)	.24**	.16**	.15**								.10**

* designates analog ABLE scales; ^ designates analog NEO-PI scales.

Correlations of BOLDS Measures (those in parentheses were not entered in the factor analyses)

	Mil.Scen	Socjud	TKML	ABLE Tot.	Dominan.	Energy	Emo.Stab.	Soc.Desir.	Trad.Val.	Wrk orient.
Mil.Scenario-6										
Soc.Judgmnt	.18**									
TKML			.21**							
(ABLE Total*)				.68**						
(Dominance*)					.59**					
(Energy*)	.09*	.16*	.93**							
(Emotional Stab.*)				.82**	.42**	.83**				
(Soc. Desir.*)			.20**	.56**	.21**	.46**	.43**			
(Trad. Values*)			.20**	.56**	.20**	.48**	.42**	.74**		
(Work orient.*)	.09*			.66**	.40**	.60**	.35**	.65**	.55**	
(Agreeable^)	.10**	.14*	.31**	.15**	.23**	.16**	.52**	.46**	.36**	
(Conscientious^)		.21**	.83**	.53**	.81**	.64**	.61**	.58**	.75**	
(Extraversion^)			.62**	.78**	.59**	.46**	.09*	.10*	.41**	
(Neuroticism^)			-.14*	-.80**	-.40**	-.76**	-.87**	-.50**	-.48**	-.42**
(Openness^)	.25**	.08*	.15*		.15**			.09*	.27**	.11**
Hardiness			.24**	.25**	.15**	.22**	.26**			.10*
Theory-6						-.21**				
Intent				-.24**	-.39**	-.16**	-.28**	-.33**	-.28**	-.43**
Transformational					.23**	.27**	.21**	.19**		.25**
Cont. Reward					.17**	.21**	.16**	.18**	.11*	.12*
Mng by Excpt - A										
Mng by Excpt - P	-.16**		-.26**	-.13*	-.79**				-.14*	-.18**
Laissez-faire	-.25**		-.21**							
MD Grade - 6	.14*	.10**	.12*	.11**	.09*	.10*			.09*	.10**
CPR Mean - 6		.12**	.13*	.09*					.11**	.13**
PAE			-.11*			.11**	.08*			
APFT - 6			.10*							.16**
AAS				-.11*		.11**				-.09*
EAS				.09**		.16**	.20**	.13**	.13**	.16**
(FAS)					.16**				.16**	.18**

* designates analog ABLE scales; ^ designates analog NEO-PI scales.

Correlations of BOLDS Measures (those in parentheses were not entered in the factor analyses)

	Agreeable	Conscien.	Extraver.	Neurot.	Open	Hardy	Theory	Intent	Transfrm	Cont Rew	MBE-Act
(Agreeable [^])											
(Conscientious [^])	.28**										
(Extraversion [^])	.07*	.49**									
(Neuroticism [^])	-.25**	-.67**	-.41**								
(Openness [^])	.08*		.20**								
Hardiness		.18**	.11*	-.25**							
Theory-6		.17**		-.25**							
Intent		-.08*	-.43**		.26**	.09*					
Transformational		.11*	.27**	.30**	-.19**	.16**	.41**	-.10*			
Cont. Reward		.21**	.27**	.16**			.32**	-.12*		.72**	
Mng by Excpt - A											
Mng by Excpt - P		-.12*	-.13*	-.17**			-.32**	-.10*		-.45**	-.39**
Laissez-faire								-.11*		-.17**	
MD Grade - 6										.12*	.12**
CPR Mean - 6										.15**	.14**
PAE											
APFT - 6											
AAS											
EAS											
(FAS)											

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Correlations of BOLDS Measures (those in parentheses were not entered in the factor analyses)

	MBE-Pass	Laissez-f	MD grd 6	CPR mn 6	PAE	APFT6	AAS	EAS	
Mng by Excpt - P									
Laissez-faire									
MD Grade - 6	-.15**								
CPR Mean - 6	-.19**		.52**						
PAE									
APFT - 6			.21**	.31**	.25**				
AAS						.23**	.16**		
EAS				.13**	.13**	-.08*			
(FAS)				.18**	.19**			.20**	

* designates analog ABLE scales; ^ designates analog NEO-PI scales.